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ABSTRACT

This study was commissioned to examine Minnesota's four public higher education systems to identify possible duplication and inefficiency in instructional programs. Study findings indicate that the two-year college systems offer a significant number of occupational programs with low student/teacher ratios, low graduate placement rates, or both. Some of the low-performing programs duplicate nearby programs, particularly in the Twin Cities area, raising further questions about their viability. The study also identified many baccalaureate programs with relatively high costs or small size that should be reviewed--particularly in the state university system. The Higher Education Coordinating Board's review of programs was found to be inadequate, and recommendations are offered for improving its reviews and those conducted by the individual systems. Appendices offer data on student/teacher ratios at public baccalaureate institutions and at the University of Minnesota and peer institutions, and data on costs per student for lower division instruction. (JDD)

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Higher Education Programs

February 1993

Program Evaluation Division
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David Chein
Marilyn Jackson-Beeck
Daniel Jacobson
Elliot Long
Marlys McPherson
Jan Sandberg
Kathleen Vanderwall
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Support Staff

Jean Barnhill
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Theresa Wagner

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Higher Education Programs

February 1993

Program Evaluation Division
Office of the Legislative Auditor
State of Minnesota

Centennial Office Building, Saint Paul, MN 55155 • 612/296-4708

STATE OF MINNESOTA
OFFICE OF THE LEGISLATIVE AUDITOR
CENTENNIAL BUILDING, ST. PAUL, MN 55155 • 612/296-4708
JAMES R. NOBLES, LEGISLATIVE AUDITOR

February 26, 1993

Members
Legislative Audit Commission

State policy makers have taken many steps to make public higher education accessible to Minnesota residents, particularly by creating a network of colleges and universities throughout the state. As state budgets have grown tighter, however, legislators have expressed increasing concerns about possible duplication and inefficiency in instructional programs. As a result, in April 1992, the Legislative Audit Commission directed us to study programs in the state's four public higher education systems.

We found many instances of programs with high costs, low placement rates, or small size, and concluded that the systems have not developed adequate guidelines for reviewing program performance. This is particularly true in the three systems that will be governed by the new Higher Education Board in 1995, as mandated by the 1991 Legislature. Some inefficient programs should be restructured or eliminated, while others need to be continued in order to fulfill institutional missions or provide necessary access to undergraduate programs. We offer recommendations to strengthen the program reviews conducted by the systems and Higher Education Coordinating Board.

We received the full cooperation of the staff and administrators of the Higher Education Coordinating Board, University of Minnesota, and the State University, Community College, and Technical College Systems.

The report was researched and written by Joel Alter (project manager), Dan Jacobson, and Jo Vos.

Sincerely yours,

James Nobles
Legislative Auditor

Roger Brooks
Deputy Legislative Auditor

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Higher Education Programs

EXECUTIVE SUMMARY

Minnesota has a long history of providing its residents with ready access to higher education programs. Its network of public colleges and universities is large and geographically dispersed. The state has 66 campuses that, together, comprise the University of Minnesota, state university, community college, and technical college systems. Direct instructional expenditures at these institutions totalled about $640 million in fiscal year 1992. Each of the four systems has a governing board that oversees management of its programs, and Minnesota's Higher Education Coordinating Board (HECB) is responsible for the development and coordination of statewide higher education policy.

In recent years, the Legislature has taken various actions to encourage the systems to differentiate their missions, reduce program duplication, and improve instructional efficiency and effectiveness. The 1991 Legislature mandated a merger of the state university, community college, and technical college systems, effective in 1995, partly to streamline and coordinate programs. During the past six years, the Legislature has also given HECB more authority to review proposed and existing programs.

Nevertheless, continuing concerns about program duplication prompted the Legislative Audit Commission to authorize a study in April 1992 looking at this issue, as well as broader issues of program efficiency and effectiveness. We asked:

- **How many similar higher education programs exist in relatively close proximity, and what evidence is there of unnecessary duplication? What cost savings could result from restructuring duplicate programs?**

- **How do instructional programs compare on general measures of efficiency and productivity, such as costs per student, student/teacher ratios, graduate placement rates, and size?**

- **How effectively do the higher education systems and Higher Education Coordinating Board review instructional programs, and what roles should they play in future program reviews?**

Overall, we found that the two-year college systems offer a significant number of occupational programs with low student/teacher ratios, low graduate placement rates, or both. These systems have not employed useful standards to identify inefficient or ineffective programs. Some of the low-performing programs duplicate nearby programs, particularly in the Twin Cities area, raising further questions about their viability. Also, we identified many baccalaureate programs with relatively high costs or small size that should be reviewed--particularly in the state university system. While some inefficient programs are necessary to fulfill institutional missions or provide student access, others should be restructured or eliminated. Finally, we conclude that the Higher Education Coordinating Board's review of existing programs has been inadequate, and we offer recommendations for improving its reviews and those conducted by the individual systems.

Each of the systems has taken steps in recent years to improve instructional efficiency and effectiveness, partly due to increasing state budget constraints. There have also been important management initiatives, such as the technical college system's formation of multi-campus regional colleges and the University of Minnesota's strategic planning process. However, the state's current financial condition requires the higher education systems to make more hard choices, and we hope that this report provides constructive direction.

A "program" is an academic or occupational discipline in which coursework is offered.

As used in this report, the term "program" refers to an academic or occupational discipline in which an institution offers coursework. We focused primarily on disciplines in which institutions offer degree or diploma programs, but our analysis of community college and university efficiency also examined disciplines in which institutions do not offer degrees.

PROGRAMS AT COMMUNITY AND TECHNICAL COLLEGES

Of the state's 18,500 sub-baccalaureate graduates in 1990-91, 96 percent were from community and technical colleges. Most of the remainder were from the University of Minnesota's Waseca campus (which closed in 1992), and its Crookston campus (which the University hopes to transform into a four-year campus).

State law authorizes Minnesota's 18 community colleges and 3 community college centers to offer programs in which all credits are accepted for transfer by baccalaureate institutions. Graduates of community colleges usually receive an "associate" degree, which full-time students can complete in two years. In occupational fields, associate degrees combine technical training with general education requirements. In 1990-91, about 44 percent of community college graduates received degrees in occupational fields, and the remainder received degrees that provided general liberal arts and sciences preparation for transfer to baccalaureate institutions.

Minnesota has 18 technical colleges with 34 campuses. Statewide, technical colleges offer more than four times as many occupational programs as community colleges. Technical colleges offer associate degrees, but state law authorizes these colleges to offer training only for occupations that do not require a baccalaureate degree. Most technical college students are in one- or two-year "diploma" programs comprised primarily of technical coursework. Increasingly, diploma programs are requiring students to complete a limited number of applied courses in fields such as communications and math.

Student/Teacher Ratios

About three-fourths of community and technical college disciplines have fewer than three full-time-equivalent faculty per campus, so measures of costs per student are very sensitive to differences in teacher salaries. Because of this, we think that student/teacher ratios are the best measure of efficiency for most technical and community college instruction. Faculty salaries and fringe benefits represent 74 percent of technical colleges' direct instructional expenditures, and 95 percent of community colleges'.

Technical college programs could operate more efficiently.

In 1992, the technical college system had 15.9 full-year-equivalent (FYE) students per full-time instructor, compared to 17.6 students per instructor for occupational fields in the community college system. In fields offered by both systems, community colleges had more students per teacher than technical colleges in accounting and secretarial disciplines, but fewer students per teacher in practical nursing.[1] We estimated that the state would have saved $1.6 million in 1992 if technical college accounting and secretarial fields operated at the student/teacher ratios of comparable fields in community colleges. The state would have saved about $200,000 if the community colleges provided practical nursing instruction at the average ratio of similar programs in technical colleges.

The 1983 Legislature mandated that the technical college system eliminate programs with ratios "significantly below" 17 students per teacher in non-health programs, and 12 students per teacher in health programs. Two years later, the Legislature repealed this requirement and asked the technical college system to set its own standards. The system's subsequent policy called for a minimum of 14 students per teacher in non-health programs, and 10 students per teacher in health programs. The 1990 Legislature eliminated the requirement for staffing standards, and the system replaced its staffing standards with an allocation formula intended to encourage efficiency. We found that:

- **About 21 percent of technical college programs had student/teacher ratios below 14:1 in both 1991 and 1992.**

1 Throughout this report, we examine costs and student/teacher ratios for instruction in various "disciplines." For example, enrollment data for the accounting discipline includes all students who take accounting courses, regardless of their major. Also, the accounting costs we report are the costs for providing courses in the accounting field and do not include the costs of non-accounting courses that accounting majors must take to earn degrees.

As shown in Table 1, a variety of occupational areas had a high percentage of low ratio programs. We found that 9 percent of technical college programs had student/teacher ratios that were at least 25 percent below the state average in their field.

Table 1: Technical College Student/Teacher Ratios By Occupational Area

Occupational Area	1992 Student FYE	1992 Statewide Student-Teacher Ratio	Percent of Programs With Ratios Less Than: 10:1[a]	12:1[a]	14:1[a]
Agriculture	672	16.7	0%	1%	14%
Marketing	1,665	14.8	8	15	29
Health	4,405	15.1	1	6	24
Home Economics	1,587	14.6	9	16	27
Business and Office	5,176	16.6	2	5	13
Technical	3,505	14.7	6	12	25
Trade and Industry	10,196	16.3	2	6	18
General Studies	3,137	17.5	--	--	--
	30,344	15.9	3%	8%	21%

Note: This table excludes management programs that are designed to operate with low student/teacher ratios, programs on Indian reservations, prison programs, and hour-based programs.

Source: Program Evaluation Division analysis of technical college data.

[a]Percentage of programs with less than this ratio in both fiscal years 1991 and 1992. Excludes 11 programs with ratios less than 14:1 that have since been closed.

We think it is reasonable for the technical college system to increase student-teacher ratios above the 1992 systemwide average of 15.9 percent. Increasing this systemwide ratio for non-health programs to 17:1, which we recommended in a report 10 years ago, would save the state $4 million annually.[2] Alternatively, if *each* technical college non-health program achieved at least a 14:1 student/teacher ratio, the state would save $2.7 million annually.[3]

Some community college disciplines have low student/teacher ratios.

Unlike technical colleges, the community college system has never had standards on minimum student/teacher ratios for programs. Instead, this system has relied on its method of allocating funds and its strategic planning and review process to encourage efficiency. Excluding health-related fields that are intended to operate with about 10 students per instructor, we found that:

- **About 15 percent of community college occupational disciplines had fewer than 14 students per instructor in both 1991 and 1992.**

If each community college non-health occupational discipline operated with at least 14 students per teacher, the state would save $290,000 annually.

2 A systemwide ratio is not a minimum ratio for individual programs. It is the average ratio of all programs, so the system could achieve a 17:1 ratio if some programs operated below this ratio.

3 There is some overlap in these savings estimates and the ones noted earlier for accounting and secretarial programs, so the estimates should not be added together to determine cumulative potential savings.

In addition to offering occupational courses, community colleges provide instruction in a variety of liberal arts and sciences disciplines. Statewide, community colleges average 26 students per teacher in these disciplines. It is not unusual for small colleges to have less than one or two full-time-equivalent faculty in many of these disciplines, and we found wide variation in student/teacher ratios. For example, three colleges averaged 15 students per teacher in economics courses over a three-year period, while two colleges averaged over 40 students per teacher in economics. Although community colleges need to provide comprehensive liberal education to fulfill their missions, we think that the system office should periodically review disciplines with low student/teacher ratios.

Graduate Placement Rates

The two-year college systems need better ways to identify occupational programs with low placement rates.

The success of occupational programs depends largely on how many graduates find jobs related to their training. The 1983 Legislature required the State Board of Technical Colleges to eliminate programs if, "in the absence of compelling reasons to do otherwise," fewer than 51 percent of its graduates found jobs that were closely related to their training. The 1985 Legislature repealed this requirement, asking the technical college system to develop its own standard. The technical college system has reviewed programs that placed less than 51 percent of their graduates in *each* of three consecutive years. However, because of the small number of graduates in most technical college programs, the placement rates vary considerably from one year to the next, and relatively few programs have failed to meet the system standard. We think it is more appropriate to examine cumulative placement rates over a two or three year period, especially in the case of small programs.

The 1991 Legislature required HECB to coordinate a uniform graduate followup reporting system for occupational fields. We think that HECB has proposed a method of calculating placement rates that is superior to those now used by the technical and community college systems. For example, unlike the approach now used by the technical and community colleges, HECB's approach will count as "available" for employment those graduates who are unwilling to relocate or who take unrelated jobs by choice.

Using a methodology similar to the one proposed by HECB, we found that:

- **Systemwide, technical colleges successfully placed 74 to 79 percent of their 1989-91 graduates, and community colleges successfully placed 78 to 83 percent of their occupational graduates.**[4]

- **Between 5 and 11 percent of technical college programs had three-year average placement rates under 51 percent. We estimate**

4 The high and low estimates reflect different assumptions about graduates who continued their education. The high estimate assumes that all graduates who continued their education were not available for employment, and therefore are not counted in the placement statistics. The low estimate assumes that graduates who continued their education *were* available for employment, as in the case of graduates who continued their schooling because they could not find work.

that about 11 percent of community college occupational programs had placement rates below 51 percent.[5]

Our approach to measuring low-placement programs identified two to four times the number of technical college programs identified by the measure that has been used by that system. Placement rates were highest for nursing programs in both systems, as well as technical college dental assistant and cosmetology programs. Among programs with at least 250 graduates from 1989 to 1991, placement rates were lowest for technical college programs in travel planning, aviation mechanics, accounting, electronics technology, and commercial art, and community college programs in law enforcement, human services technician, and business.

Program Duplication

There is more program duplication within systems than between systems.

We looked at the extent to which similar programs were available within close geographic proximity of each other. We found that 18 percent of Minnesota's sub-baccalaureate programs have a duplicate within 20 miles, 27 percent have a duplicate within 35 miles, and 50 percent have a duplicate within 60 miles. Program duplication is much more common in the Twin Cities area than in the rest of the state, as shown in Table 2. We found that:

- **Most program duplication occurs *within* the community and technical college systems, rather than *between* systems.**

For example, we identified 432 programs that have a duplicate program from the same system within 60 miles, compared to 103 programs that have a duplicate program from another system within 60 miles. Most of the *inter-system* duplication is in accounting and secretarial programs.

Program duplication is not necessarily a bad thing, and can be justified by high student or employer demand. To determine instances of *unnecessary* program duplication, we examined student/teacher ratios and placement rates for duplicated programs. As shown in Table 3,

- **About 10 percent of technical college and 6 percent of community college non-health programs have a similar program within 35 miles and have low student/teacher ratios or low placement rates.**

We estimated that the state could have saved nearly $1 million in fiscal year 1992 by increasing to 15:1 the student/teacher ratios of programs with low ratios that were within 35 miles of similar programs.

5 The community college estimate assumes that 50 percent of graduates who continued their education were available for employment. We discuss the basis for this assumption in Chapter 2 and provide information on placement under alternative assumptions.

Most duplication is in the Twin Cities area.

Table 2: Occupational Program Duplication by Region for Technical and Community Colleges

	Twin Cities		Outstate		
	Technical Colleges	Community Colleges	Technical Colleges	Community Colleges	Total
Number of Programs	224	62	535	91	912
Number With Duplicate Programs Within:					
20 miles	121	39	5	3	168
35 miles	150	46	35	12	243
60 miles	156	47	228	27	458
Percent With Duplicate Programs Within:					
20 miles	54%	63%	1%	3%	18%
35 miles	67	74	7	13	27
60 miles	70	76	43	30	50

Note: Includes duplication between and within technical and community college systems. Does not include Associate in Arts programs. Does not count Associate in Science and Associate in Applied Science programs in the same field as duplicates.

Source: Program Evaluation Division analysis of 1992 technical and community college inventories.

About 10 percent of two-year college programs are located near a similar program and are either inefficient or have low placement rates.

Table 3: Duplicate Programs at Two-Year Colleges With Low Student/Teacher Ratios or Placement Rates

	Total Programs In Non-Health Fields	Number of Programs With Duplicates Within 35 Miles That Have: Student/Teacher Ratios Below 15:1[a]	Placement Rates Below 60 Percent[b]
Technical Colleges	543	41	22
Community Colleges	127	1	7
Total	670	42	29

Note: This table uses benchmarks for student/teacher ratios and placement rates that are slightly above those used earlier. We think duplicated programs should be subject to higher standards than other programs. Six technical college programs in this table have *both* low ratios and low placement rates.

Source: Program Evaluation Division analysis of community and technical college data.

[a]Based on two-year average ratio for fiscal years 1991-92. Excludes health programs, small business management programs, and farm business management programs.

[b]Based on our high estimate of three-year placement rates using HECB's proposed method. This estimate excludes graduates who are continuing their education. Excludes programs with fewer than 10 graduates for 1989-91.

PROGRAMS AT STATE UNIVERSITIES AND THE UNIVERSITY OF MINNESOTA

Minnesota has 10 public campuses that offer baccalaureate degrees: three campuses of the University of Minnesota and seven state universities. These institutions awarded more than 16,000 baccalaureate degrees in 1990-91 in about 230 fields of study. In addition to baccalaureate instruction, these universities (particularly the University of Minnesota's Twin Cities campus) also offer post-baccalaureate instruction and fulfill important research and community service roles.

Program Duplication

Ten public institutions offer baccalaureate degrees.

In contrast to our analysis of sub-baccalaureate programs, we did not evaluate baccalaureate program duplication using commuting distances of 20, 35, and 60 miles. Only two of Minnesota's public four-year institutions are within 60 miles of each other. More important, baccalaureate institutions serve fewer "placebound" students than the two-year colleges, and it is common for students to change their residence to attend a university. Thus, we looked at baccalaureate program duplication from a statewide perspective. We found that:

- **There is considerable program duplication among Minnesota's baccalaureate institutions, but much of this duplication is necessary to provide basic arts and sciences education consistent with the mission of comprehensive universities.**

Of the 230 fields in which Minnesota's public institutions offer baccalaureate degrees, about 48 percent have degree programs available at more than one institution. These "duplicated" programs accounted for 92 percent of Minnesota's 1990-91 baccalaureate graduates. Computer and information science is the only field in which all 10 public universities offer degree programs. However, all universities except Metropolitan State University have degree programs in music, English, psychology, political science, history, sociology, theatre, chemistry, physics, mathematics, biology, teacher education, German, and art.

Although universities must offer coursework in traditional liberal arts and sciences fields, it is possible that some departments in these and other baccalaureate fields are inefficient or ineffective. Some might be offering degree programs or specialized coursework in fields where they should primarily offer introductory coursework. For this reason, we looked at program size, cost, and graduate placement.

Program Size and Cost

Academic administrators generally agree that university departments and programs must achieve a certain "critical mass" of students and faculty to be effi-

cient and offer high quality instruction, although we heard differing opinions on what constitutes minimally-acceptable program size. For example, most administrators agreed that individual baccalaureate programs need at least three faculty to be viable, but the University of Minnesota's College of Liberal Arts suggested in 1990 that its departments with fewer than 10 faculty should be reorganized to improve efficiency and effectiveness. We found that:

- **Within Minnesota's public institutions, 11 percent of departments that primarily provide undergraduate instruction have fewer than three faculty, and 26 percent have fewer than five.**

We also found that 18 percent of the university departments averaged fewer than 10 graduates annually *and* fewer than 140 full-time-equivalent students.

Minnesota's new engineering programs have had fewer graduates and higher costs than originally projected.

Since 1983, the public higher education systems have started nine new engineering programs, and the number of campuses offering engineering increased from one to five. We found that the new programs are much smaller than engineering programs elsewhere in the U.S., and have graduated only about one-third of the students originally projected. These programs have also had much higher costs per student than originally projected, and their costs per student are 70 percent more than the engineering programs offered at the University of Minnesota's Twin Cities campus. Engineering programs require considerable investment in facilities and equipment, so their costs per student are closely related to program size. We concluded that the decision by the Legislature and higher education systems to add these programs at multiple sites has been an expensive one. A 10 percent reduction in the cost of the new engineering programs would save the state $450,000 annually.

As we evaluated baccalaureate program costs, we focused most of our attention on the costs of "upper division" instruction. Upper division courses are directed primarily toward juniors and seniors, and their costs reflect institutional choices to offer specialized coursework in fields, rather than providing only introductory or general education courses. Table 4 compares the upper division costs of various fields commonly offered in universities. We found that the University of Minnesota's Twin Cities campus had lower costs per student than the state universities in most liberal arts fields. State universities had lower costs than the Twin Cities campus for teacher education, business, chemistry, biology, and computer science, but higher costs for mathematics, physics, and engineering.

Within particular academic fields, we found considerable variation in costs per student among state universities. For example, we found that 19 percent of state university departments had costs per student more than 40 percent above the system average in their respective fields in 1990-91. A 10 percent expenditure reduction in these departments would save the state about $800,000 annually. While degree programs in some of these fields are essential to the universities' missions, we think that institutions should consider restructuring or eliminating high cost programs in selected instances.

In most liberal arts fields, the University's Twin Cities campus had lower costs per student than the state university average.

Table 4: Fiscal Year 1991 Upper Division Costs Per FYE Student, Selected Disciplines

	State Universities	University of Minnesota--Twin Cities	University of Minnesota--Duluth
LIBERAL ARTS			
Anthropology/Sociology	$3,462	$2,958	$2,619
Economics	3,847	2,129	4,102
History	4,254	3,108	2,683
Political Science	3,058	3,824	3,534
Psychology	2,673	1,827	2,587
Art	4,368	3,308[a]	4,174
Music	8,753	8,238	6,487
Philosophy	5,774	3,304	2,604
Geography	3,341	3,631	3,725
German, French, Spanish	5,037	6,112	5,443
English	3,047	2,509	3,305
Speech	1,776	2,812	2,473
Theatre	8,217	5,367	3,826
Mass Communications	4,701	4,711	--
Women's Studies	3,816	2,509	5,808
American Indian Studies	--	4,034	5,732[b]
SCIENCE AND ENGINEERING			
Math	4,759	3,622	3,111
Physics	8,532	5,714	6,888
Geology	14,393	18,920	6,084
Chemistry	7,786	9,019	4,703
Biology	6,206	6,568	4,374
Computer Science	4,395	5,158	5,387
Engineering	13,587	7,648	12,727
BUSINESS			
Accounting	2,866	3,827	4,630
Other Business[c]	2,761	4,559	3,859
EDUCATION			
Teacher Education	3,052	6,145	4,725
Physical Education	3,979	4,726	2,711
Technical Education	5,051	12,820	5,973

Note: These are the "direct instructional costs" of upper division coursework in these fields. The costs in each field do not include general education or non-major elective coursework that are required of students completing baccalaureate degrees in that field. Most faculty at the University of Minnesota are expected to conduct more research and community service activities than state university faculty as part of their regular workloads, and the costs of these activities are generally included in this table.

Source: Program Evaluation Division analysis of 1991 average cost funding reports of the University of Minnesota and State University Board office.

[a]Includes studio art ($5,388) and art history ($2,358).

[b]Department does not offer degree programs.

[c]Does not include business education or hospitality.

Because of restrictions in university tenure codes and faculty contracts, it is more difficult to achieve immediate cost savings by eliminating baccalaureate programs than by eliminating programs at technical and community colleges. Administrators have interpreted the University of Minnesota's tenure code to prohibit faculty layoffs even in the case of campus closings. Under the state university faculty contract, administrators cannot lay off tenured faculty

members with at least 20 years of service in the system. Because of these restrictions, it is especially important for the systems and HECB to hold programs accountable during their early years of existence.

Graduate Followup

While technical colleges regard preparation of students for employment as their main function, baccalaureate institutions view this as one of many functions. Nevertheless, one important measure of the success of undergraduate programs is the extent to which their graduates find satisfactory work or continue their education. We found that:

- **There is considerable variation in the graduate followup data collected by baccalaureate institutions.**

The percentage of teacher education graduates finding full-time teaching jobs dropped from 61 to 41 percent in the past decade.

Most of the state universities have placement offices that annually survey a high percentage of their graduates, both in teaching and non-teaching fields. In contrast, the University of Minnesota does not have centralized policies for graduate followup, and its larger Twin Cities colleges have had low response rates to followup surveys.

A baccalaureate field with noteworthy placement problems is teacher education, which is offered by nine public universities. The percentage of teacher education graduates finding full-time teaching jobs dropped from 61 percent in 1981 to 41 percent in 1991. We found that:

- **The decline in teacher placement rates resulted from an expansion of programs--especially in state universities--that was larger than the job market could absorb.**

State universities, which produce more than half of Minnesota's new teachers, increased their number of graduates by nearly 60 percent during the past decade, while demand for new teachers did not increase. Minnesota's public and private institutions are currently graduating about 2,000 new elementary teachers a year, even though the state Department of Education estimates that Minnesota school districts will be *eliminating* 240 elementary positions a year statewide between 1995 and 2000.

PROGRAM REVIEW

Each of the higher education systems has developed its own approaches to program review. The systems have scrutinized their instructional programs more closely in recent years, partly reflecting tighter state budgets. There have also been important management initiatives such as the technical college system's creation of regional colleges, the community college system's student success program, the state university system's development of quality indicators, and the University of Minnesota's strategic planning and budget reallocation. The single most important program change in recent years was the University's

decision to close its Waseca campus in 1992, which the University estimates could eventually free up more than $6 million annually for reallocation.

Better program review could save state dollars or redirect funds to higher priorities.

Despite these efforts, there continue to be instances of unnecessary duplication, inefficiency, and ineffectiveness among Minnesota's wide array of higher education programs. The State Board of Technical Colleges is the only public governing board that has adopted a system standard for evaluating the efficiency or effectiveness of existing programs, and its single standard for graduate placement rates has been, in our judgment, too lenient. We think the use of reasonable standards for efficiency and effectiveness by all four systems could potentially save several million dollars annually, or make this funding available for reallocation.

The Minnesota Higher Education Coordinating Board (HECB) has had authority to review proposed and existing higher education programs since 1971. During most of this time, HECB's role has been advisory. The Legislature gave HECB authority to "approve or disapprove" new programs in 1987, and extended this authority to existing programs in 1991. We looked at HECB actions between fiscal years 1981 and 1992 and found that the board approved (or gave a positive recommendation to) 92 percent of all requests for new programs at public institutions, and never rejected a proposal. Institutions withdrew their proposals in eight percent of the cases, usually because of questions raised by HECB staff.

Most of Minnesota's higher education programs predate HECB, which was established in 1967. Consequently, most programs have never gone through HECB's review process for new programs. We found that:

- **The Higher Education Coordinating Board has not effectively used its authority to review existing programs.**

HECB has not reviewed many existing programs.

In 1986, HECB's own consultant determined that program review was a low priority in the agency. Since that time, HECB has not increased its staffing for review of public programs, despite its increased authority. HECB administrators noted that an increasing number of legislative mandates has kept the agency from devoting more staff to this function. HECB has done a very limited number of reviews of existing programs, especially in the two-year college systems. We also found that many baccalaureate programs that were reviewed by HECB prior to implementation in recent years have failed to perform as well as projected, suggesting a need for followup reviews.

HECB's ability to review programs has been impaired by its lack of a reliable statewide program inventory. The individual higher education systems have not maintained sufficiently accurate inventories, nor has HECB provided the guidance necessary to correct this problem, until recently. It remains to be seen whether the inventory developed in 1992 by HECB and the systems can be kept accurate and up to date.

In late 1992, HECB outlined a process for reviewing existing programs on an annual basis. In our view, this new policy is unfocused and provides the higher education systems with little guidance about what constitutes acceptable program review. Also, HECB has not developed practical criteria to guide its own decisions about when to "disapprove" existing programs.

RECOMMENDATIONS

Program review is a necessary activity for institutions, governing boards, and the Higher Education Coordinating Board. An important challenge for Minnesota higher education is to identify distinct roles for each. We think that institutions and system offices should continue to do most of the program review activity, but ultimate accountability should rest with the governing boards and HECB. Campus administrators, who are responsible for implementing program changes, acknowledge many of the issues discussed in this report. However, they often encounter campus resistance to proposals for program restructuring or elimination, and we think they need encouragement from system administrators and governing boards.

In 1995, the governing boards for the state university, community college, and technical college systems will be replaced by a single board, the Higher Education Board (HEB). This will reduce the number of public governing boards in Minnesota from four to two. To the extent possible, we think HEB should establish common standards for evaluating occupational programs at two-year colleges. Meanwhile, HECB should focus more attention on program comparisons between the state university and University of Minnesota systems, which will continue to operate under separate governing boards.

HECB should have general guidelines for reviewing programs, and the systems should adopt specific standards.

As shown in Figure 1, we envision a system of program review in which: (1) HECB sets general *program review guidelines* for all four public higher education systems and outlines the types of specific performance standards it expects systems to have, (2) the systems adopt *performance standards* for evaluating individual programs, and (3) the systems regularly *monitor* the performance of all of their programs, while HECB periodically evaluates programs in selected fields. Toward this end, we recommend that:

- **In 1993, the Higher Education Coordinating Board should develop guidelines to help the higher education systems evaluate the performance of their programs.**

We suggest that HECB develop program review guidelines for systems similar to those developed by Illinois' Board of Higher Education, discussed in Chapter 1. HECB should also use the guidelines to help determine when to disapprove existing programs.

- **The governing boards or system offices should adopt standards for evaluating the efficiency and effectiveness of programs or departments. The system offices of the technical college,**

Figure 1: Types of Program Review Appropriate for Institutions, Systems, and the Higher Education Coordinating Board

REVIEWS BY INSTITUTIONS

- Reviewing and justifying programs that fail to meet governing board systemwide standards (e.g., standards for enrollment, placement, student/teacher ratios, or cost) or stricter standards established by the institution.
- Developing benchmarks against which to measure the future performance of programs that are unique or that have low performance on certain measures.
- Conducting cyclical reviews of individual programs, departments or disciplines (by officials at the institution or peers outside the institution).
- Coordinating accreditation reviews (where appropriate).

REVIEWS BY GOVERNING BOARDS OR SYSTEM OFFICES

- Establishing and maintaining a systemwide database on enrollment, cost, placement, staffing, and other measures of performance deemed appropriate.
- Developing performance standards for programs and asking institutions to justify programs that fail to meet these standards.
- Comparing similar programs across institutions on performance measures.
- Establishing budget allocation processes that reward high quality, high-priority programs and provide incentives for efficiency.
- Considering ways to make better use of existing system capacity, or encouraging students to use less expensive instructional programs.[1]
- Delineating missions among various types of institutions, especially in two-year occupational programs (Higher Education Board).
- Collecting and reviewing institutions' cyclical program reviews.
- Establishing a systemwide database indicating "accreditable" programs and the accreditation status of each.

REVIEWS BY HIGHER EDUCATION COORDINATING BOARD

- Developing general guidelines to help systems evaluate the performance of higher education programs and to guide HECB in decisions to "disapprove" existing programs.
- Approving and disapproving new programs (probationary and final approvals).
- Conducting strategic reviews of multiple programs in selected fields, and analyzing fields in which the state has a surplus or shortage of graduates.
- Working with systems to develop general performance benchmarks (such as systemwide student/teacher ratios), and monitoring progress toward these benchmarks.
- Maintaining an up to date program inventory.
- Ensuring that governing boards have reasonable approaches to program review.
- Publishing consumer information (e.g., placement data and the program inventory).

[1]This is particularly applicable to the Higher Education Board, which will be responsible for curricula, such as lower division accounting, that are offered in all three of its systems.

community college, and state university systems (and eventually the Higher Education Board) should periodically compare program performance *among* institutions. The Higher Education Board should begin developing program review standards that will take effect in 1995.

There is not widespread agreement on what exact standards to use. Standards could be used to identify programs with low performance on measures such as enrollment, placement rates, student/teacher ratios, cost per student, or combinations of these measures. The standards could be based on peer comparisons or system goals. Some measures, such as placement rates for occupational pro-

grams, should be reviewed annually, while others might be reviewed less frequently. In the case of student/teacher ratios, standards should differ by program type, with lower minimum ratios for fields that primarily have laboratory or workshop courses.

Programs that fail to meet standards should be eliminated, restructured, or reviewed further.

System offices should ask institutions to justify programs failing to meet the standards, and could then eliminate, restructure, or further examine these programs. In the case of programs that are unique in certain ways or not easily compared to peers, system offices could ask institutions to establish benchmarks for evaluating the programs' future performance. The University of Minnesota has proposed such benchmarks for its Crookston campus, and should consider developing them for other academic programs as part of its 1993 strategic plan. Chapter 4 offers some additional recommendations for data collection and program review.

The governing boards should review how they allocate funds and try to incorporate incentives for program efficiency. However, we do not think the systems should rely solely on funding incentives to encourage better program performance. System offices should still periodically measure program performance against governing board standards.

To improve program oversight by HECB, we recommend that:

- **The Higher Education Coordinating Board should approve new programs on a probationary basis and review the programs for final approval three to five years later, depending on program length.**

- **In addition to granting probationary and final approvals, HECB's program reviews should consist primarily of (1) reviews of multiple programs in strategically selected fields, and (2) analyses of fields in which the state has a surplus or shortage of graduates. HECB should ensure that the systems establish reasonable program review standards, and should ask each system to annually update its program inventory.**

In February 1993, the State Board of Technical Colleges adopted a stricter placement standard for its programs, to be phased in during the next year. To further improve oversight of the two-year college programs, we recommend that:

- **The technical college system should measure placement rates using HECB's proposed method. The State Board for Community Colleges should adopt similar measures for occupational programs, and should adopt placement standards.**

- **The governing boards for two-year colleges should consider more stringent standards for student/teacher ratios and placement in programs that duplicate others nearby.**

Improved consumer information on higher education programs can provide incentives for more program accountability. The 1991 Legislature's requirement of a statewide followup system for graduates of occupational programs was an important first step, but we recommend that:

- **The Legislature should consider extending its requirements for a post-secondary graduate followup system to *all* baccalaureate programs, to be coordinated by HECB. Information on non-occupational programs could be collected and published every five years.**

- **As part of the graduate followup reporting system, HECB should collect wage data every three to five years for occupational fields.**

The addition of engineering programs at several new institutions in recent years was an expensive decision. Cost should be one of many considerations in future decisions about these programs, and we recommend that:

- **The Legislature should ask HECB to prepare a report for the 1995 legislative session on the merits of consolidating engineering programs, including a cost analysis.**

In light of the surplus of teacher education programs in the state, we think that such programs with high costs should receive special scrutiny. We recommend that:

- **HECB should ask institutions with high-cost teacher education programs to (1) evaluate the potential for cost reductions, and (2) set benchmarks for future program efficiency and effectiveness.**

Institutions could reduce teacher education enrollments further, or continue trying to ensure that students know enough about job prospects to make informed career choices.

Even if all programs operated at relatively low cost, we think it is still worth asking whether the interests of the state and students are served by continuing to prepare the present number of graduates for a career field with relatively low employment demand. The teacher surplus could be addressed by eliminating entire programs or reducing enrollments in existing programs. Most of the public institutions have started implementing modest enrollment reductions in the past two years. Alternatively, institutions could continue to respond to student demand for teacher education programs, giving students complete choice to enter a field with limited job prospects. This strategy requires that prospective students have sufficient information on placement and employment demand. Institutions report that they now provide this, although no statewide surveys have evaluated graduates' satisfaction with the placement information they have received.

Finally, our analysis of duplication focused primarily on *programs* leading to degrees or diplomas, but two-year colleges also offer many individual *courses* in fields in which they do not offer specialized degrees. We think there may be opportunities for cost savings through better coordination of similar courses at nearby institutions and recommend that the Higher Education Board evaluate course-level duplication.

Introduction

Minnesota has a long history of providing its residents with ready access to higher educational programs, particularly through a large network of public colleges and universities. However, there have also been longstanding legislative concerns about program duplication, mission delineation, and the increasing costs of higher education. Minnesota's direct instructional expenditures for public higher education were about $640 million in fiscal year 1992.

There have been many recent legislative efforts to encourage institutions to delineate their missions and review their programs. The 1991 Legislature mandated a merger of the state university, community college, and technical college systems, effective in 1995, partly to streamline, differentiate, and coordinate the programs offered by these systems. The Legislature also expanded the Higher Education Coordinating Board's authority to review new and existing instructional programs, and adopted statutory mission statements for each of the public systems.

In April 1992, following the Program Evaluation Division's completion of a report on higher education administrative spending, the Legislative Audit Commission authorized the division to study instructional programs offered by the state's four public higher education systems. The study developed primarily from legislators' concerns about possible duplication of programs, but our earliest discussions with legislators indicated broader concerns about program efficiency and effectiveness. As a result, we outlined a study that asked the following questions:

- **How many similar higher education programs exist in relatively close proximity, and what evidence is there of unnecessary program duplication? What cost savings could result from eliminating or restructuring duplicate programs?**

- **How do instructional programs compare on general measures of efficiency and productivity, such as costs per student, student/teacher ratios, graduate placement rates, and size?**

- **How effectively do the higher education systems and Higher Education Coordinating Board review instructional programs, and what roles should they play in program review?**

We limited our review to public baccalaureate and sub-baccalaureate programs. Because the focus of our study was higher education *programs,* we gave particular attention to two-year occupational programs and upper division coursework at baccalaureate institutions; we gave less attention to lower division instruction in academic fields. To answer these questions, we used *program inventories developed by the systems and the Higher Education Coordinating* Board, and we used data on enrollments, graduates, placement, staff, and costs supplied by each of the systems. We also interviewed system and institution officials, reviewed program and course descriptions, and visited 12 campuses.

Chapter 1 provides background on the higher education systems and discusses our research methods. Chapter 2 reviews sub-baccalaureate programs, and Chapter 3 reviews baccalaureate programs. Chapter 4 discusses and evaluates the types of program review now conducted, and offers recommendations for improved review.

In the report, we discuss specific instances of programs that do not perform well on some general measures of efficiency and effectiveness. Some of these programs are worthwhile and should be continued despite these problems; others should be restructured, eliminated, or subjected to further review. We recognize that there are important aspects of programs that we have not fully considered, such as instructional quality, research, and community service activities. However, we present these lists of programs in order to provide higher education decision makers with a constructive point of departure for future discussions.

Chapters 2 and 3 discuss the fiscal implications of *selected* improvements in efficiency, such as decreasing cost per student in duplicated programs or increasing systemwide technical college student/teacher ratios. These examples are not exhaustive, but they represent the more readily apparent areas of potential savings. Because we look at cost savings using varying staffing standards (such as bringing all individual two-year college programs up to a 14:1 ratio or establishing a systemwide 17:1 average ratio), there is some overlap in our savings estimates. Therefore, readers should not simply add our various estimates to determine cumulative savings.

Background

CHAPTER 1

This chapter is organized into three parts. First, we provide general information about the missions and governance of Minnesota's four public higher education systems, as well as the Higher Education Coordinating Board. Second, we discuss the research methods used in our study. Third, we discuss actions taken by the Legislature and systems during the past decade to delineate missions and encourage program review.

MINNESOTA'S HIGHER EDUCATION SYSTEMS

Minnesota has more students per capita in public higher education than most other states.

Minnesota has one of the highest rates of participation in higher education of any state. For every 1,000 residents, Minnesota had 40 students in public higher education in 1991-92, compared to 33 nationally.[1] Moreover, the interest of Minnesota residents in higher education is not new. Before a capital or territorial legislature had been established in Minnesota, there were discussions about starting a university. By the time Minnesota became a state in 1858, the University of Minnesota already existed.

Today, Minnesota has four public higher education systems: the University of Minnesota, and the state university, community college, and technical college systems. There are also a variety of private colleges that offer baccalaureate and graduate degrees, as well as vocational programs. Figure 1.1 shows the number of full-year-equivalent (FYE) students in each of Minnesota's post-secondary systems.[2]

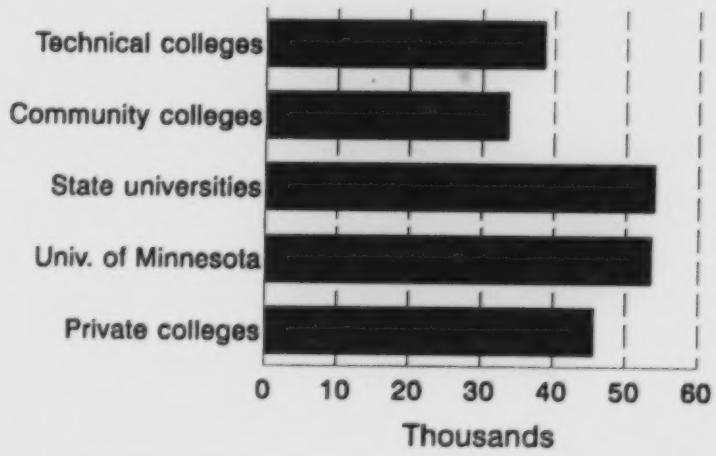
For at least 40 years, Minnesota policy makers have tried to make higher education geographically accessible. In 1950, the Minnesota Commission on Higher Education recommended additional colleges so that 90 percent of Minnesota residents would have a higher education institution within 35 miles.[3]

1 Kent Halstead, *State Profiles: Financing Public Higher Education 1978 to 1992* (Washington, D.C.: Research Associates of Washington, October 1991). Minnesota ranks eleventh highest among the states.

2 Full-year-equivalent is calculated by dividing the total number of credit hours for a year by the normal credit load for full-time students (45 credits for undergraduate and 30 credits for graduate).

3 Minnesota Commission on Higher Education, *Higher Education in Minnesota* (Minneapolis: University of Minnesota Press, 1950), 374-5.

Figure 1.1: Students (FYE) in Minnesota Higher Education Systems, FY 1992



Source: Higher education systems, HECB.

Minnesota now has 66 public campuses, compared to an average of 31 in other states.[4] Figure 1.2 shows the locations of these campuses.

Organization and Governance

University of Minnesota

The University of Minnesota is the state's "flagship" institution.

The "flagship" institution of Minnesota's higher education system is the University of Minnesota. Established in 1851, this is Minnesota's land grant institution, its primary research institution, and the state's only public institution that grants doctorate degrees. Governed by a Board of Regents, the University's mission is to:

> offer undergraduate, graduate, and professional instruction through the doctoral degree, and shall be the primary state supported academic agency for research and extension services.[5]

The University of Minnesota has four campuses and is one of the nation's largest universities, with a total enrollment of about 53,500 FYE students in 1992. This includes about 33,000 undergraduate students, 15,500 graduate students, and 5,000 continuing education and extension students. As shown in

4 The national data includes accredited campuses only. Most of Minnesota's technical colleges are not regionally accredited, but will pursue accreditation during the next two to three years. National Center for Education Statistics, *Digest of Education Statistics: 1991* (U.S. Department of Education: Washington, D.C., November 1991), 232.

5 *Minn. Stat.* §135A.052, Subd. 1.

Minnesota has a large network of colleges and universities.

Figure 1.2: Location of Higher Education Institutions

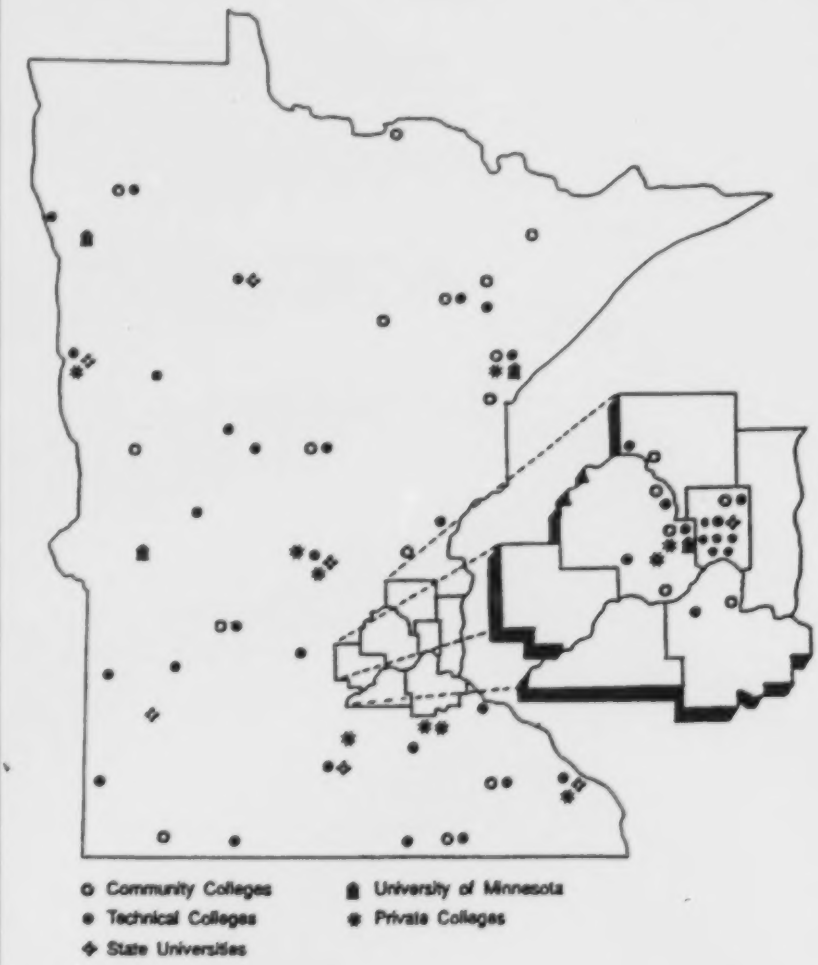
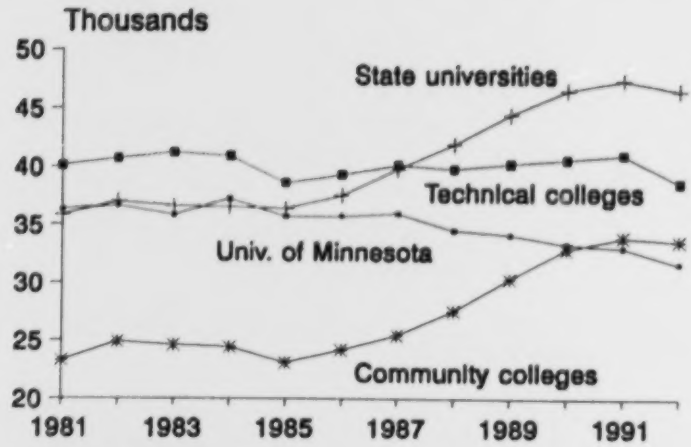


Figure 1.3, the University's undergraduate enrollment has declined about 14 percent since 1987, when the University started to implement a priority-setting agenda known as Commitment to Focus. Under that plan, the University has determined its highest priority programs and shifted resources to them.

More than 70 percent of the University's undergraduate students are enrolled at the Twin Cities campus. This campus has 18 colleges, listed in the box on page 6. Some of these colleges, such as Liberal Arts and Technology, primarily serve undergraduate students. Others, such as Law and Medicine, provide professional and graduate degrees, and serve few, if any, undergraduate students. The campus receives a substantial part of its funding from external sources. In 1991, the campus spent more than $200 million for externally-

State university and community college enrollments have increased.

Figure 1.3: FYE Undergraduate Enrollment in Minnesota Public Higher Education, 1981-92



Source: Higher education systems.

sponsored research, training, and public service--primarily in the Medical School and Institute of Technology.

The Duluth campus, with nearly 20 percent of the University's undergraduate students, serves the northern Minnesota region and has a variety of baccalaureate and master's degree programs. The Morris campus has a narrower mission, emphasizing the liberal arts and sciences. It serves about 6 percent of the University's students and has no graduate programs. The Crookston campus currently offers two-year "associate" degrees, but no baccalaureate degrees. In July 1992, the Board of Regents voted to convert Crookston to a four-year "polytechnic" institution, offering 12 career-oriented baccalaureate degrees but no sub-baccalaureate degrees. Minnesota's Higher Education Coordinating Board will consider this proposal in March 1993.

University of Minnesota	1992 FYE Enrollment
Twin Cities campus (Includes the following colleges: Liberal Arts; Management; Natural Resources; Technology; Agriculture; Human Ecology; Education; Architecture; Biological Sciences; Dentistry; Medicine; Veterinary Medicine; Nursing; Pharmacy; Public Health; Law; Humphrey Institute; General College)	36,805
Duluth campus (Includes the following colleges: Business and Economics; Liberal Arts; Science and Engineering; Education and Human Services; Fine Arts; Medicine)	6,694
Morris campus	1,845
Crookston campus	871
Summer session and continuing education	6,863
TOTAL	53,078

State University System

Minnesota has seven state universities, shown at the right. According to state law, this system:

> shall offer undergraduate and graduate instruction through the master's degree, including specialist certificates, in the liberal arts and sciences and professional education...[6]

State Universities	1992 FYE Enrollment
St. Cloud	14,586
Mankato	14,086
Moorhead	7,950
Winona	6,636
Bemidji	4,734
Metropolitan	3,156
Southwest	2,601
TOTAL	53,749

Five of the state universities were established to train teachers.

Between 1860 and 1919, five of these institutions started as "normal schools," for the explicit purpose of training teachers. In 1917, normal schools started requiring their students to have high school degrees before enrolling, and several years later the Legislature changed their names to "state teacher colleges." After World War II, the Legislature expanded the colleges' mission to include more than teacher education and changed their names to "state colleges." In 1963, the colleges began offering master's degrees in fields other than education, and the Legislature changed their names to "state universities" in 1975.

The Legislature authorized two additional state universities during the past 30 years. Southwest State University started enrolling students in 1967 and is the only state university that does not have graduate programs. Metropolitan State University started enrolling Twin Cities area students in 1972. Metropolitan State differs from the other state universities in three ways: (1) it provides only the final two years of baccalaureate degrees, (2) it focuses on adult students, most of whom are already employed, and (3) most of its baccalaureate degrees are "individualized" rather than being based on a pre-set curriculum of required courses and electives. In 1990, the state university system started offering classes at an adjunct campus in Akita, Japan.

Historically, the state universities have viewed themselves as serving regional missions. The universities have focused their student recruiting on particular geographic areas, and have served as research and service centers for people and businesses in these regions.

Although there has been an increase in the number of part-time students enrolled at state universities, about 70 percent of students are full-time. More than 90 percent of the state university system's 54,000 FYE students are undergraduates, and more than 80 percent of freshmen graduated from high school the previous spring. State university undergraduate enrollments grew about 30 percent between 1985 and 1992.

In 1990, the state university system's governing board created a Blue Ribbon Commission on Access and Quality. Reflecting the themes of the University of Minnesota's Commitment to Focus, the commission expressed concerns

6 *Minn. Stat.* §135A.052, Subd. 1.

that its universities were trying to accomplish too many things with limited resources:

> We also fear the (State University System) continues to follow an old agenda. That agenda is centered around the belief that the System must serve everyone with nearly every kind of educational need, regardless of whether or not the System has the resources to do so.[7]

The commission developed seven indicators of quality education. These indicators suggested that state university students should:

- Enter the university with adequate preparation;
- Demonstrate "higher order thinking" skills;
- Demonstrate global and interdisciplinary perspectives;
- Demonstrate multicultural perspectives;
- Demonstrate scientific and quantitative literacy;
- Demonstrate readiness for the workplace; and
- Demonstrate responsible citizenship.

The state university system is implementing stricter admission standards.

Beginning in 1994, the state university system will implement stricter admission standards. Incoming students must demonstrate completion of four years of English, three years of math, three years of science, three years of social studies, and three electives from at least two of the following areas: world language, world culture, or the arts.

Six of the state universities are in cities that do not have a community college, and five offer students the option of a two-year Associate in Arts degree comparable to those offered by community colleges.[8] Minnesota's Higher Education Coordinating Board has suggested that the statutory authorization for these associate degrees at state universities is unclear, and has recommended that the state university system seek legislative clarification in 1993.

Community College System

Minnesota has 18 regionally accredited community colleges and three centers, shown on the next page. State law authorizes these colleges to:

> offer lower division instruction in academic programs, occupational programs in which all credits earned will be accepted for transfer to a baccalaureate degree in the same field of study, and remedial studies, for

7 Blue Ribbon Commission on Access and Quality in the Minnesota State University System, *Q-7: Quality on the Line* (St. Paul, 1990).

8 As described later in this chapter, the associate in arts degree is a broad liberal arts and science degree that is intended to provide the foundation for a four-year degree.

students transferring to baccalaureate institutions and those seeking associate degrees.[9]

"Lower division" instruction generally refers to coursework taken during the first two years of a four-year degree program.

Minnesota has 18 community colleges and three community college centers.

The Cloquet school board established the first "junior college" in 1914. Several other school districts started colleges soon after this, although the Legislature did not formally authorize districts to do so until 1925. The Legislature first authorized state funding for these colleges in 1957. In 1963, the Legislature created a governing board to oversee this system of colleges. By 1970, all of the state's present community colleges were in operation.[10]

Community Colleges	1992 FYE Enrollment
Normandale (Bloomington)	5,576
North Hennepin (Brooklyn Park)	3,612
Lakewood (White Bear Lake)	3,240
Anoka-Ramsey (Coon Rapids)	3,045
Inver Hills (Inver Grove Heights)	2,738
Rochester	2,639
Minneapolis	2,618
Brainerd	1,180
Willmar	1,081
Itasca (Grand Rapids)	887
Fergus Falls	878
Austin	789
Hibbing	732
Mesabi (Virginia)	724
Northland (Thief River Falls)	605
Vermilion (Ely)	595
Worthington	593
Rainy River (International Falls)	466
Cambridge Center	720
Duluth Center	568
Fond du Lac Center (Cloquet)	329
TOTAL	33,614

In addition to the 18 colleges, there are three community college "centers," each affiliated with a larger campus. The Cambridge Center opened in 1978 and is administered by Anoka-Ramsey Community College. The 1987 Legislature established the Fond du Lac Center in Cloquet. Mesabi Community College coordinates some of its administrative functions. The Duluth Center initially developed nursing and radiation technician programs in the late 1980s, but did not receive legislative authorization until 1992. The 1992 Legislature required that the Duluth Center and Duluth Technical College develop an "integrated administrative structure and coordinated program delivery...."[11]

The community college system's FYE student enrollment grew faster than any of Minnesota's other public systems in recent years--about 47 percent since 1985. About 56 percent of community college students are part-time. In a 1987 survey, 53 percent of students said they hoped to eventually transfer community college credits to a four-year college.[12]

Community colleges are open to students regardless of their previous school performance. The community college system's governing board has initiated a "student success" program to improve colleges' rates of retention, gradu-

9 *Minn. Stat.* §135A.061, Subd. 1.

10 All are fully accredited by the North Central Association.

11 *Minn. Laws* (1992) Ch. 513, Art. 1, Sec. 4, Subd. 3.

12 The system office surveyed 1,700 students at six colleges.

ation, and student transfer. All students taking eight credits or more must have their basic skills assessed, and colleges offer "developmental" reading, math, and writing courses to students who score low on these assessments.

Community college students who complete a two-year program may receive one of three types of "associate" degrees, and we distinguish among these degrees later in this chapter. However, all associate degrees require students to complete "general education" courses in liberal arts and sciences that have been designed for transfer to baccalaureate institutions.[13]

Technical College System

The technical college system consists of 18 colleges with 34 campuses, shown at the right. The first technical institute opened in 1947, and all of the present campuses were established by 1972.[14] Like community colleges, Minnesota's technical colleges do not have admission standards. By state law, these colleges shall "offer vocational training and education to prepare students for skilled occupations that do not require a baccalaureate degree...."[15]

Technical Colleges	1992 FYE Enrollment
Northwestern (Bemidji, Detroit Lakes, East Grand Forks, Wadena, Thief River Falls, Moorhead)	5,483
Hennepin (North, South)	3,953
St. Paul	2,966
Riverland (Austin, Rochester, Faribault)	2,423
Hutchinson/Willmar	2,202
Mankato/Albert Lea	2,095
Southwestern (Granite Falls, Canby, Pipestone, Jackson)	2,068
Anoka	2,026
Alexandria	1,956
Minneapolis	1,898
Dakota County	1,815
Northeast Metro	1,743
St. Cloud	1,697
Brainerd/Staples	1,662
Duluth	1,430
Red Wing/Winona	1,401
Hibbing/Eveleth	1,288
Pine City	492
TOTAL	38,600

Technical colleges train students for immediate employment.

Minnesota's technical and community colleges presently operate under separate state governing boards, although both offer training that will lead to immediate employment in occupational fields. State law restricts technical colleges to this limited mission, while community colleges also offer occupational programs in fields that require baccalaureate degrees. Although technical college programs are intended to help students find immediate employment, these colleges have been trying to improve the transferability of their credits to baccalaureate institutions. Technical college system administrators have encouraged all colleges to seek regional accreditation during the next two to three years, and the state university system has deter-

13 Community colleges also have a limited number of "certificate" programs in specialized fields, but these account for less than five percent of all awards.

14 Until 1984, when the Legislature created a state governing board for technical colleges, these institutions were administered by the Minnesota Department of Education.

15 *Minn. Stat.* §135A.052, Subd. 1.

mined that, starting in 1995, it will only accept credits for transfer from accredited technical colleges.

In contrast to community colleges, most technical college students are enrolled in one of a wide variety of diploma programs, ranging in length from several months to two years. Diploma programs used to consist solely of technical coursework, but many technical colleges now require students in these programs to take applied courses that teach writing, speaking, math, critical thinking, and problem solving. Still, diploma programs require less coursework in liberal arts and sciences than the associate degree programs offered by technical and community colleges.

The technical college system has created many regional colleges in recent years.

The 1991 Legislature directed the technical college system's state board to form regional colleges throughout the state, exempting the state's 10 largest colleges. During the past two years, the number of colleges went from 27 to 18 through a series of mergers. These colleges are organized in the following ways:

- Seven colleges are governed by the local elementary/secondary school district in which the college is located. The technical college president reports to the superintendent and school board of the local district. The district manages the college's budget, sets college policies, and oversees personnel and contract negotiations.

- Three colleges in the Minneapolis-St. Paul suburbs are governed by intermediate school districts.[16]

- Eight regional multi-campus colleges are governed by joint districts formed by the local school districts in which the campuses are located. The first regional college (Southwestern Technical College) was created in 1985, and seven others have formed since 1991.

Technical college enrollment was relatively stable during the past decade, but the composition of the student body changed considerably. Technical colleges have restructured programs to allow students to more easily attend school on a part-time basis. Part-time students now account for about 55 percent of all students. Increasingly, technical colleges have developed hour-based (formerly called "extension") courses for currently employed workers who do not require extensive programs, and many of these courses have been customized to meet the needs of individual businesses. As a result, the number of hour-based students has doubled since 1985. In contrast, enrollment in "regular" technical programs declined slightly.

16 See *Minn. Stat.* §136D for legislative authorization for intermediate districts. These districts provide vocational and special education services to member school districts, as well as other educational services requested by districts.

Recent Changes in Governance

Currently, each of the public higher education systems has its own governing board, appointed by the Governor. However, the 1991 Legislature voted to replace the individual governing boards of the state university, community college, and technical college systems with a single board in 1995. The effect of this action is that the number of public higher education governing boards will decrease from four to two: the University of Minnesota's Board of Regents and the new Higher Education Board (HEB).

The governing boards for three systems will be consolidated in 1995.

Members were appointed to the HEB in mid-1991, and the board hired an interim chancellor in January 1993. The separate governing boards of the three systems will cease to exist on July 1, 1995. According to state law:

> The mission of the board is to provide programs of study that meet the needs of students for occupational, general, baccalaureate, and graduate education. The board shall develop administrative arrangements that make possible the efficient use of the facilities and staff of the former technical colleges, community colleges, and state universities for providing these several different programs of study, so that students may have the benefit of improved and broader course offerings, ease of transfer among schools and programs, integrated course credit, coordinated degree programs, and coordinated financial aid. In carrying out the merger of the three separate systems, the board shall control administrative costs by eliminating duplicative administrative positions and course offerings.[17]

The HEB has authority to prescribe courses of study, set admission standards, and adopt policies for the institutions it manages. Technical college faculty, who are now school district employees, will become part of a new state bargaining unit, and other technical college employees will become part of existing state bargaining units.

Legislators enacted the HEB for several reasons. First, they felt that a single board could more effectively and objectively implement the state's higher education program priorities and reduce unnecessary program duplication. Second, legislators believed that the merger would enable the state to limit its investments in new facilities. This could be accomplished by limiting enrollments at growing campuses and reducing the time that students spend pursuing degrees.[18] Third, legislators suggested that having a single state board and system office for three higher education systems would reduce administrative costs.[19]

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17 Minn. Laws (1991) Ch. 356, Art. 9, Sec. 4.

18 The board could reduce the time needed to graduate by facilitating credit transfers between institutions. Some students have had to repeat courses when credits taken at one institution have not transfered to another.

19 See Office of the Legislative Auditor, *Higher Education Administrative and Student Services Spending: Technical Colleges, Community Colleges, and State Universities* (St. Paul, March 1992). That report estimated that merging co-located technical and community colleges might save $3 to $4 million annually in administrative costs, and merging central offices might save another $1 million. However, it also noted that merging the central offices would require a significant financial investment to develop common information systems.

Higher Education Coordinating Board (HECB)

In addition to the individual higher education systems and their governing boards, Minnesota's Higher Education Coordinating Board (HECB) has an important role in post-secondary education. According to state law, this 11-member board and its staff agency shall:

HECB coordinates higher education policy, conducts long-range planning, and reviews programs.

- Study and analyze public and private higher education and develop plans and programs to meet the needs of the state;
- Conduct long-range higher education planning;
- Approve or disapprove proposals for new programs and changes in existing programs, and identify priorities among these proposals. When reviewing proposals for programs, the law specifies that HECB consider whether the program "is necessary, a needless duplication, beyond the capability of the system or institution considering its resources, or beyond the scope of the system or institutional mission;"
- Periodically review existing programs, and approve or disapprove continuation or modification of existing public higher education programs;
- Approve or disapprove proposals for new instruction sites and changes in existing sites, and identify priorities among these proposals;
- Help develop and implement agreements among the systems that ensure transferability of credits among institutions; and
- Obtain reports from private post-secondary institutions indicating how they use state funds.[20]

HECB also administers all federal higher education funds allocated to Minnesota. The single function that requires the largest portion of HECB's staff resources is administration of federal and state financial aid programs.[21] Aside from its administrative duties, much of HECB's agenda is determined by specific legislative directives for reports and studies.

Funding

Since 1983, the Legislature has provided base-level funding to Minnesota's public higher education systems using an approach known as "average cost funding." Systems receive state funds based on (1) the number of students they have in various categories of instruction, and (2) the average cost of these programs. The average cost funding formulas are based on enrollment data

20 Minn. Stat. §136A.04.

21 HECB has about 45 state-funded positions, and another 26 positions funded by self-sustaining loan programs.

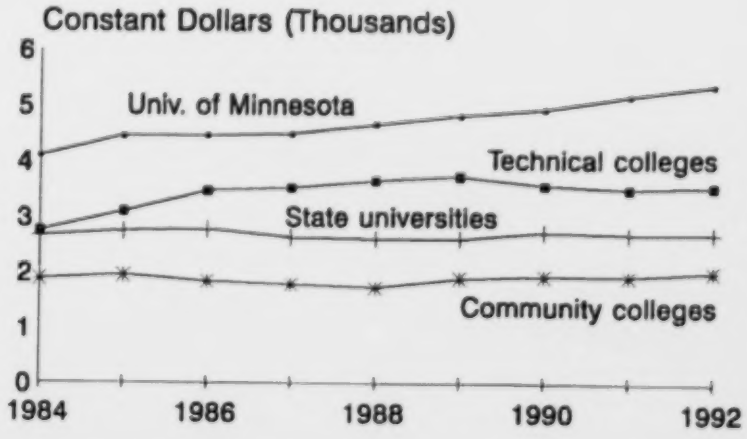
that are two years old, so the enrollment increases experienced by systems in recent years were not immediately reflected in appropriations. Average cost funding provides base-level funding for the systems, but the Legislature can appropriate additional funds for special purposes.

Since 1987, the Legislature has not used average cost funding to provide base-level appropriations to the University of Minnesota. Because the University has been reducing enrollments and internally reallocating funds as part of its Commitment to Focus plan, the Legislature has used this plan and its enrollment targets as the basis for funding.

The higher education systems receive state funding for 60 to 70 percent of their instructional costs; tuition makes up most of the balance. State law limits the number of students in each system that can be funded with direct appropriations. Systems that exceed these limits must use tuition to pay for costs. Figure 1.4 shows the direct instructional expenditures per student for each of the higher education systems in recent years. Nationally, Minnesota's 1991-92 higher education revenues per student were slightly above the national average (18th among the states), while its state and local revenues per capita ranked higher (11th among the states).[22]

The University of Minnesota has the highest instructional cost per student, and community colleges have the lowest.

Figure 1.4: Direct Instructional Cost Per Student For Higher Education Systems, 1984-92



Source: Department of Finance, higher education systems.

22 Kent Halstead, *State Profiles: Financing Public Higher Education 1978 to 1992* (Washington, D.C.: Research Associates of Washington, October 1992).

RESEARCH METHODS

There have been longstanding legislative concerns about program duplication within Minnesota's higher education systems, and these concerns were a key impetus for this study. From the outset of our research, we have recognized that the duplication of higher education programs, per se, is not a bad thing. Duplication may be necessary to meet student demand, fulfill institutional missions, or serve place-bound students.

However, duplication becomes an issue when the duplicated programs also have:

- Insufficient demand by students or employers,
- Higher costs or lower student/teacher ratios than similar programs at other institutions,
- Insufficient numbers of students or faculty to maintain quality instruction, or
- Missions inappropriate to the sponsoring institutions.

Thus, evidence of program duplication is useful only when used in combination with other measures of program performance. In contrast, some measures, such as placement rates for occupational programs, can *by themselves* signal possible problems with programs.

We looked at various measures of program performance.

Our approach in this study was to begin with some general measures of what we viewed as the Legislature's overriding concern: program performance and efficiency. The measures we used were student/teacher ratios, cost per student, placement rates, and measures of "critical mass" (program enrollments and number of graduates produced). We used these measures to review all programs in the four public higher education systems, whether duplicated elsewhere in the state or not. Our first aim was to determine whether these measures suggested program areas in which it might be possible to improve efficiency or effectiveness.

Most higher education programs are offered at more than one location in the state. In this broad sense, they are "duplicated." Throughout this report, we supplement our discussion of program performance with observations on whether it might be possible to reduce program duplication.

As we conducted our analysis, we found guidelines developed recently by the Illinois State Board of Higher Education to be instructive. This statewide coordinating board has tried to influence priorities in its higher education systems by adopting a set of 25 guidelines for improving "productivity." Figure 1.5 lists several of the guidelines that pertain to direct instruction. The guidelines are useful because (1) they recognize the importance of looking at various

Figure 1.5: Selected Guidelines for Productivity Improvements in Illinois Higher Education

- Institutions should consider eliminating programs whose credit hours, enrollments, and degree production significantly deviate from the statewide or institutional average credit hours, enrollments, and degrees produced per program, particularly if other factors exist such as high program costs or low occupational demand.
- Institutions should consider eliminating or reducing programs in fields of study in which projected statewide job openings are low or are projected to slow or decline, particularly if other factors exist such as high program costs, low program quality, or low occupational placement.
- Institutions should consider eliminating fields that enroll a relatively small proportion of non-majors, particularly if there is also low occupational demand, low program quality, or high program costs.
- Institutions should reduce the number of courses and specializations offered when necessary to achieve a cost-effective level of enrollment per course.
- Institutions should consider elimination of instructional units that have been found to have quality deficiencies based upon their most recent program reviews.
- Institutions should consider eliminating programs that exhibit low job placement rates, lack of student and alumni satisfaction and support, and low graduate admissions or pass rates on licensure exams.
- Institutions should consider eliminating programs whose costs significantly deviate from the statewide average expenditures per FTE in the discipline, particularly if other conditions such as low student or occupational demand or low program quality exist.
- Institutions should consider focusing the scope of their offerings to achieve appropriate student/teacher ratios, program-major cost levels, and enrollment and degree production levels across fields of study and by levels of instruction.
- Institutions should assure that any declining trends in instructional workloads are evaluated and should consider modifying workload policies when faculty workloads are significantly less than institutional, statewide, or national averages.

Source: Illinois Board of Higher Education, *Guidelines for Productivity Improvements in Illinois Higher Education* (March 1992).

measures of program efficiency and effectiveness in combination, rather than in isolation, and (2) they are designed to provide a decision-making framework to administrators and governing boards, rather than dictating programmatic decisions.

Definition of "Program"

There are varying ways to define what constitutes a higher education program. At one extreme, a program may consist of a particular set of courses at an institution that, when completed, lead to a particular degree or award--such as coursework leading to a one-year diploma in fashion merchandising. On the other hand, it is reasonable to think of a program as consisting of all courses and degrees at an institution that relate to a more generally defined field or academic discipline--such as accounting or sociology. For this reason, there is no

single answer to the question, "How many instructional programs are offered in Minnesota's higher education systems?"

State law gives HECB authority to review, approve, and disapprove new and existing higher education programs. The 1990 Legislature mandated HECB to compile by November 1990 an inventory of all programs offered on and off campus at post-secondary institutions; the statutes do not define what constitutes a program.[23] HECB has maintained statewide inventories of instructional programs for more than 20 years, and generally has regarded a program as an area of study with a sequence of courses, activities, or experiences that lead to a degree or other formal recognition. This is similar to the first definition of program discussed above. As we note in Chapter 4, the inventories developed before 1992 by HECB and the higher education systems--including the 1990 inventory--did not have accurate, comprehensive lists of programs and were not kept up to date.

Historically, the term "program" has been ill-defined.

Some officials in the higher education systems expressed concerns to us that HECB has lacked clear definitions of programs. For many years, HECB regarded programs as consisting of at least the equivalent of 15 quarter-credits, although this was never formally adopted as policy. In 1992, Minnesota's Higher Education Advisory Commission (HEAC)--comprised of the heads of the public higher education systems and representatives of private colleges--declared that a higher education program has one or more of the following characteristics:

1. Courses are offered in a pattern or grouping that is formally identified as an area of study on a transcript;

2. A group of courses are marketed as preparation for career entry; or

3. A group of courses are in a discipline that is new to an institution.[24]

Many institutions advise their students about possible areas of specialization *within* degree programs. These are often referred to as options, concentrations, tracks, and emphases. HEAC determined that, for purposes of program review and approval, these specializations should not be viewed as separate programs.

Using HEAC's guidelines on program definition, HECB asked each of the public higher education systems to submit updated program inventories during Summer 1992. For our analysis of program duplication, HECB's 1992 inventory of higher education programs was a starting point. As we used the inventory:

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23 Minn. Laws (1990), Ch. 591, Art. 3, Sec. 9.

24 To encourage full reporting of programs, HEAC adopted a policy that students registering in programs not listed in the 1992 HECB program inventory should not be counted in the system's and institution's funding base.

1. We looked at baccalaureate and sub-baccalaureate programs separately, but have disregarded other differences in program length.

Thus, if a college offers both a one- and two-year certificate in accounting, we have counted these as a single sub-baccalaureate accounting program for purposes of analyzing duplication.

2. We used a nationally-accepted coding system as a starting point for distinguishing programs.

HECB assigns codes to programs that are consistent with the federal Classification of Instructional Program (CIP) system. The first four digits of this code reflect general fields of study (such as secretarial programs), and the next two digits distinguish between more specific programs (such as legal secretarial and medical secretarial programs). For most fields of study, we found that these six-digit codes adequately reflected important distinctions between programs.[25]

3. We combined various types of baccalaureate degrees.

Thus, for purposes of counting duplication, we have not distinguished bachelor of arts and bachelor of science degree programs in the same field.

4. We distinguished among programs with various types of associate degrees.

Because Associate in Science (AS) degrees are explicitly designed for transfer to four-year institutions, we considered these distinct from Associate in Applied Science (AAS) degrees, which are primarily intended for use in immediate employment. However, as we discuss in Chapter 2, analyzing these degree programs separately made little difference in our overall findings on program duplication. For purposes of analyzing program duplication, we did not count Associate in Arts (AA) degrees, which are general liberal arts degrees designed for transfer to baccalaureate institutions. Twenty-one community colleges and five state universities offer AA degrees.

As we looked at other measures of instructional efficiency and effectiveness, such as enrollment, staffing, and placement rates, we often used broader definitions of programs because of the ways in which the systems kept their data. For example, the technical college system aggregates data from various types of secretarial degree and diploma programs into a single "cost center." The community colleges maintain most data by "disciplines," such as political science. Similarly, four-year institutions aggregate most programmatic data by academic departments, such as biology or chemistry, rather than by individual degree programs.

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25 HECB has added two additional digits to the CIP codes to further differentiate certain categories of programs. In some cases--notably teacher education--we needed to use all eight digits to distinguish programs by type. In selected two-year programs--such as secretarial, accounting, and wholesale/retail merchandising--we defined programs more broadly than the six-digit code to reflect the "cost centers" in which the technical college system groups its programs.

We did not analyze duplication among *graduate* degree programs in Minnesota institutions, nor did the Legislative Audit Commission request such a review.[26] An evaluation of graduate programs would require national and regional data on program availability and employer demand, and we limited our review primarily to information on Minnesota programs. In our analysis of university department size, we excluded those departments whose enrollments were less than 85 percent undergraduate. Our rationale was that the contributions of graduate instruction and research--which we did not review--to departmental efficiency and effectiveness might offset some of the problems faced by small undergraduate units.[27]

Program Duplication

Higher education policy makers have often struggled to reconcile the twin goals of program efficiency and program access. Offering programs at multiple locations in the state can be expensive, particularly if the programs require administrative support, equipment, and supplies at each site. On the other hand, offering multiple programs improves access for students. This is particularly important in the case of non-residential two-year colleges, which were established to serve particular communities of the state. Compared to four-year institutions, the two-year colleges have tended to serve more "placebound" students--that is, those unable or unwilling to move to other communities to attend school. In the late 1960s, the Higher Education Coordinating Board formally recommended that the state have at least one publicly-supported post-secondary institution within 35 miles of every Minnesota community with a population of 5,000 or more.

For our analysis of duplication among two-year institutions, we considered various distances that students could be expected to commute to attend school. Specifically, we looked at the extent to which similar programs are available within distances of 20, 35, and 60 miles of each other, as well as looking at the total number of programs of each type available statewide. In the case of the four-year institutions, most of the campuses are at least 60 miles apart and are residential in nature. Thus, we looked at the number of similar four-year programs available statewide, rather than looking at various commuting distances between programs.

Some program duplication is justifiable.

Most post-secondary academic and occupational programs are available at more than one location in Minnesota. However, this "duplication" may be justified to:

- Respond to the demands of students and employers;

26 We did include the University of Minnesota's post-baccalaureate teacher education programs in our review because the curriculum of these programs is similar to the curriculum in undergraduate teacher education programs.

27 This criterion excluded about two-thirds of departments at the University of Minnesota's Twin Cities campus, but relatively few departments at other campuses. We reviewed all departments in our analyses of undergraduate costs.

- Provide a core curriculum of basic arts and sciences to all students; or
- Better serve the needs of different types of students, such as students who need special supportive services or part-time students.

For example, all of the undergraduate programs offered by Winona State University's Rochester Center are also available at its main campus, 45 miles away. But most of the students at the Rochester Center are working adults who attend classes at night, while most of the students at the Winona campus are younger, more traditional college students.

Likewise, nearly all of the programs offered by the University of Minnesota's Morris campus are traditional liberal arts and sciences programs available at any of the state's public four-year institutions. However, the academic standards of Morris' incoming freshmen far exceed those of all other public universities in Minnesota, as well as those of most private four-year colleges.[28]

Sometimes there are differences in curricula among programs that initially appear to be duplicative. For example, most of the community and technical colleges offer accounting programs, and there are many similarities among the curricula of these programs. However, in *some* cases, technical college courses emphasize skills directly related to employment (such as bookkeeping), while the community college courses provide a broader range of training and more focus on theory. Baccalaureate institutions are much more likely to transfer accounting credits from community college graduates than technical college graduates. During our study, we explored curriculum differences in selected subject areas by reviewing course catalogs and talking to institution administrators.

Higher education systems should consider which program differences are important enough to sustain.

Of course, no two programs at different institutions have completely identical curricula. There are always some differences in program focus, course content, teaching methods and materials, and instructional quality, and there may also be differences in program purpose and length. In some cases, these differences are significant and might justify multiple programs in the same general field of study. But at a time when higher education resources are scarce, it is worth asking what instructional differences are important enough to sustain, especially in cases where duplicated programs have low enrollment, high costs, or low demand for graduates.

This report does not offer recommendations or conclusions regarding the University of Minnesota's proposal to transform its Crookston campus from a two-year campus into a baccalaureate institution. There are five baccalaureate institutions within 100 miles of Crookston (Moorhead State University, Bemidji State, Concordia College, North Dakota State University, and the University of North Dakota). Some of the programs proposed by Crookston, such as

28 In Fall 1991, 62 percent of Morris' freshmen were students from the top 10 percent of their high school classes. In contrast, these high-ranking students comprised only 10 to 20 percent of the state universities' freshmen, and 27 percent of freshmen at the University's Twin Cities campus. Only Carleton College (72 percent) had a higher ranking freshman class than Morris. *Peterson's Guide to Four-Year Colleges: 1993* (Princeton, NJ: Peterson's Guides, 1992).

those in business administration and early childhood education, have the potential for overlap with programs at other institutions. However, the University's detailed proposals for degree programs at Crookston were submitted to HECB in January 1993, which did not allow time for us to conduct a thorough review. Moreover, we felt that such a review might interfere with and duplicate the review being conducted by HECB, which is scheduled to act on these proposals in March 1993.

Data and Methods

To provide a context for our analysis of program efficiency and performance, we tried to obtain similar types of data for each of the four public higher education systems. Specifically, we collected data by program on the following:

- Full-year-equivalent enrollment;
- Number of full-time-equivalent instructors;
- Number of graduates;
- Instructional expenditures, including supply and equipment costs; and
- Number of graduates finding employment or continuing their education.

Some institutions were unable to provide useful data in all of the categories listed above. For example, as discussed in Chapter 3, there is inconsistency in the graduate followup data collected by four-year institutions.

Because student and employer demand for programs can fluctuate over time, we looked at enrollment, graduate, and placement data over a three-year period, when possible. In the case of expenditure and staffing data, our analyses focused more on the most recent year for which data were available, in order to more accurately reflect fiscal reallocations in each of the systems. We obtained 1991 data for all categories of data listed above, and 1992 data where available.

To help us better understand curriculum differences among programs, we obtained course catalogs from each of Minnesota's public higher education institutions. We interviewed central administrators from each of the systems, made phone contacts with about half of the institutions, and visited 12 campuses for more in-depth interviews with academic officials.

Clearly, there are other indicators of program performance besides the ones we reviewed. For example, we did not systematically examine quality of teaching, graduation and retention rates, the research and service activities closely associated with many programs, graduate wage rates, and the importance of particular fields to state and national economic development. For this reason, some of the programs that this report identifies as needing further review might be justified by these other factors. This is particularly true for

baccalaureate institutions, whose missions are broader than those of two-year institutions.

Nevertheless, this study represents the first time that information on many key program indicators has been aggregated from all of the public higher education systems for the purpose of program review. We think this broad overview of key measures of program performance can (1) highlight programs for further review by systems or institutions, (2) examine issues of program efficiency and effectiveness across system and institutional boundaries, and (3) explore the feasibility of conducting similar forms of program review on an ongoing basis.

We estimated the fiscal impact of selected efficiency improvements.

Chapters 2 and 3 discuss the fiscal implications of *selected* improvements in efficiency, such as decreasing cost per student in duplicated programs or increasing systemwide technical college student/teacher ratios. These examples are not exhaustive, but they represent the more readily apparent areas of potential savings. We have not estimated potential savings from eliminating or restructuring programs with low placement rates because savings would depend on whether students interested in these fields would enroll in other programs at public institutions. In the case of programs with low student/teacher ratios, we have estimated the savings that would result from achieving higher ratios. Because we look at the possible savings under varying staffing standards (such as bringing all individual programs up to a minimum 14:1 ratio or establishing a systemwide 17:1 average ratio), there is some overlap in our savings estimates. Therefore, readers should not simply add our various estimates to determine cumulative savings.

In Chapter 4, we discuss the types of program review conducted by each system and HECB. We used HECB records to summarize the actions it took on program proposals submitted by Minnesota's public higher education systems during the past decade. In addition, we reviewed each public higher education system's board minutes and internal data to determine program approvals and terminations between January 1987 and mid-1992.

We recognize that future decisions about higher education programs may be difficult, but we think that the state's present financial status requires that hard choices be made. As the University of Minnesota's 1988 strategic plan stated:

> In order to provide funds for its most urgent priorities, the University will have to exercise a rigorous discipline. No program now in place is without merit; none is without external support; none is now funded too generously. But some priorities are more urgent than others, because needs are more desperate, or because programs are more central.[29]

29 University of Minnesota, Twin Cities campus, *Commitment to Focus: Academic Priorities (1988-1993)* (Minneapolis, February 1988), 67.

EFFORTS TO DELINEATE SYSTEM MISSIONS AND ENCOURAGE COOPERATION

Over the past decade, the Legislature has encouraged the higher education systems to delineate their missions and review their programs. In part, this reflected concerns that programs offered by one system were duplicating programs offered by another system. The 1983 Legislature required that each public post-secondary system develop biennial "system plans." In these plans, each system must "review its mission as it relates to instruction, research and public service."[30] Under present law, system plans must address the following:

The Legislature has encouraged systems to delineate missions and review programs.

- Program priorities for undergraduate, graduate, and professional education;
- The effects of proposed program and enrollment changes on other systems;
- Plans for adjusting the number of facilities, staff, and programs to meet projected levels of demand;
- Current and projected uses of community outreach and extension programs;
- Enrollment projections for two, five, and ten years;
- Options for managing enrollments and adjusting the number of facilities, staff, and programs, and the financial implications of each;
- Opportunities for providing services cooperatively among institutions; and
- Ways in which missions can be differentiated and coordinated.[31]

The 1985 Legislature supplemented the planning requirements by stating that:

> It is the further intent of the legislature that the system missions be differentiated from one another to best serve the needs of the citizens of Minnesota.... The systems, in cooperation with the higher education coordinating board, shall jointly review their missions, develop strategies to achieve mission differentiation, and create an overall intersystem plan that ensures achieving the state's post-secondary objectives.[32]

30 *Minn. Laws* (1983) Ch. 258, Sec. 34, Subd. 2.

31 *Minn. Stat.* §135A.06.

32 *Minn. Laws* (1985, 1st Special Session) Ch. 18, Sec. 18., Subd. 1,2.

Historically, technical and community colleges have offered programs in some similar occupational fields. In the early 1980s, most technical college programs consisted entirely of technical training, while community colleges offered "associate degrees" in these fields that combined technical training with education in liberal arts and sciences. At the time, state law allowed technical colleges to offer associate degrees only when such a degree was (1) required by a licensing board, and (2) offered in cooperation with a collegiate institution, such as a community college. Responding to employer demands, the technical colleges became increasingly interested in offering associate degrees, in addition to their wide range of diploma programs. The 1985 Legislature allowed technical colleges to offer associate degrees even if graduates did not need these degrees for licensure.[33]

In 1986, HECB convened a task force to recommend standards for associate degrees. The task force determined that associate degree programs must contain a liberal arts and sciences component. The task force defined three types of associate degrees:

There are three types of associate degrees.

- **Associate in Arts (AA).** These programs are designed to provide a broad liberal arts and sciences background, and should not be identified with a major in a subject field. The major objective of an AA degree is to fulfill the first two years of a baccalaureate program, not to provide technical preparation for employment. At least two-thirds of the credits required for an AA degree are in general education.

- **Associate in Science (AS).** Like the AA degree, the AS degree is intended primarily for students planning to transfer their credits to a baccalaureate program. However, the AS degree is designed to provide a foundation for specific baccalaureate degrees, such as engineering and business. For this reason, its course requirements are usually more structured and technically-oriented than those for AA degrees.

- **Associate in Applied Science (AAS).** Unlike other associate degrees, AAS degrees are intended primarily to prepare students for employment. Because of this, at least half of the AAS credits are in technical courses. Only one-third of the credits required for an AAS degree are in general education.

Figure 1.6 summarizes the distinctions among these degree types.

The community and technical colleges reached a formal agreement in 1986 to delineate system missions. Under the agreement, community colleges became the sole providers of AA and AS degrees. New AAS programs would be provided cooperatively, with technical colleges teaching technical courses and community colleges teaching general education. The community college system agreed to develop AAS programs at only the three colleges that were not

33 Minn. Laws (1985) Ch. 122, Sec. 5, Subd. 1. Technical colleges' Associate in Applied Science (AAS) degrees were to be offered in cooperation with collegiate institutions--such as community colleges--where possible. The two-year college systems agreed to cooperate in AAS programs at technical and community colleges within 35 miles of each other.

Figure 1.6: Types of Associate Degrees

	Associate in Arts (AA)	Associate in Science (AS)	Associate in Applied Science (AAS)
Primary Objective	Pre-Baccalaureate	Pre-Baccalaureate	Preparation For Employment
Available at community or technical colleges?	Community Colleges	Community Colleges	Community Colleges Technical Colleges[a]
Do students receive degrees in a major field?	No	Yes	Yes
Minimum total credits	90	90	90
Minimum general education credits designed for transfer			
- Total	60	45	30
- Communication	8	6	3
- Social Science	12	6	3
- Humanities	12	6	3
- Math/natural science	12	6	3
- Other credits from these core subject areas	16	21	18
Minimum technical education credits	0	0	45

Source: Higher Education Coordinating Board, *Report of the Task Force on Associate Degree Standards* (St. Paul, March 1986), 8.

[a]Since 1986, new AAS programs have been provided cooperatively, with technical colleges teaching technical courses and community colleges teaching general education. Community colleges have some "stand-alone" AAS programs that pre-dated the 1986 agreement. Also, there are three community colleges and two technical colleges that provide stand-alone AAS degrees because they are not located close to a college in the other system.

located close to a technical college. The technical college system agreed to provide the general education components of AAS degrees at only two locations that were not paired with a community college, state university, or University of Minnesota campus. AAS programs that existed before the agreement were left in place.

The new standards for associate degrees did not ensure that all credits from these degrees would transfer to baccalaureate institutions. Since 1985, the state universities have agreed to accept the AA degree as fulfillment of baccalaureate general education requirements. However, the transferability of technically-oriented courses is subject to agreements negotiated between individual baccalaureate and two-year institutions. As a general rule, baccalaureate institutions have been less willing to transfer technical credits from Minnesota's technical colleges than from community colleges. Most general education credits taken toward an AS or AAS degree transfer to baccalaureate institutions, but this is subject to agreement between the institutions involved.

The systems have been working to implement mutually acceptable guidelines for transfer of general education credits.

In 1989, a report commissioned by HECB to consider Minnesota's future higher education needs said that "there is a relatively small amount of unwarranted duplication in program offerings."[34] The report suggested that the state should focus less attention on duplication and more on other measures of efficiency. For example, it suggested encouraging students to attend less costly institutions and eliminating low priority or under-enrolled programs.

Despite efforts of the systems and HECB, the Legislature has continued to have concerns about mission delineation and program duplication in recent years. In the sections that follow, we discuss recent actions by the systems and Legislature.

1990

The 1990 Legislature:

- Asked the state university, community college, and technical college systems to submit reports suggesting methods for reducing duplication of programs.[35]
- Required HECB to report on "duplication in programs and the level of the systems' cooperative efforts."[36]
- Asked the governing board of each public higher education system to review its mission statement and recommend any required changes.[37]

In addition, the 1990 Legislature repealed a statutory requirement that required the state technical college board to have policies for minimum class sizes and placement ratios. The Legislature also required the board to "provide prospective students with consumer information before they enroll in the system."[38]

1991

HECB said that the legislatively-requested reports on program duplication developed by the higher education systems in 1991 "could have gone further in

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34 SRI International, *Maintaining Minnesota's Educational Advantage: An Analysis of Future Higher Education Needs and Alternative Strategies to Address Them in Minnesota* (St. Paul, February 1989), 87.

35 *Minn. Laws* (1990) Ch. 591, Art. 3, Sec. 9, Subd. 3.

36 *Ibid*, Sec. 11.

37 *Ibid*, Sec. 12.

38 *Minn. Laws* (1990), Ch. 430, Sec. 1. The 1983 Legislature directed the board to eliminate programs with placement rates below 51 percent or student/teacher ratios significantly below 17:1 for non-health and 12:1 for health programs. The 1985 Legislature repealed this provision, requiring the board to adopt its own policies for these measures.

addressing apparent duplication in existing programs," and that a more detailed study was needed.[39]

HECB issued its own study of duplication in 1991. The study was based primarily on a review of HECB's program inventory and did not review program enrollments, staffing, or placement. HECB reported that, "Despite cooperative ventures by institutions in the two systems, occupational program duplication continues, especially in secretarial and accounting programs."[40] It recommended that, by November 1992, each of the public higher education systems report on their progress in reducing on-campus sub-baccalaureate program duplication.[41]

The 1991 Legislature enacted mission statements for each system.

The 1991 Legislature adopted into law the mission statements described earlier in this chapter. It asked each of the higher education systems to review its programs for compliance with the mission statements, and it asked the heads of these systems to jointly determine whether programs inconsistent with the missions have been eliminated. The Legislature asked HECB to develop recommendations "for linking funding of the systems to achievement of system plans and missions..., and to achievement by students of system and institution learner outcomes."[42]

The Legislature expanded HECB's authority to review instructional programs. HECB already had authority to approve or disapprove proposals for new programs, but the 1991 Legislature extended this authority to existing programs. The Legislature directed that:

> The higher education coordinating board shall oversee the implementation of the transfer and elimination of programs. The board shall ensure that duplicate and inappropriate programs are identified and that changes are made in a timely manner.[43]

The Legislature also created the Higher Education Board to oversee the state university, community college, and technical college boards. Among its duties, the board was authorized to "control administrative costs by eliminating duplicative administrative positions and course offerings," "prescribe courses of study," and "avoid duplicate program offerings."[44]

In addition, the 1991 Legislature created an "intersystem council" to improve communications among the post-secondary systems on policy issues. The council includes representatives from these systems and HECB, and is sup-

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39 HECB, *Review and Comment on System Plans for Managing Enrollment and Review and Comment on System Reports on Mission Statements* (St. Paul, February 21, 1992), 13.

40 Higher Education Coordinating Board, *Program Inventory and Off-Campus Activities of Minnesota Post-Secondary Education Institutions* (St. Paul, February 21, 1991), 2.

41 As of January 1993, only the community college system had submitted a report to HECB.

42 *Minn. Laws* (1991) Ch. 356, Art. 3, Sec. 15.

43 *Minn. Laws* (1991) Ch. 356, Art. 2, Sec. 1, Subd. 3.

44 *Minn. Laws* (1991) Ch. 356, Art. 9, Sec. 4-5.

posed to consider issues that affect more than one system. According to state law, these issues may include:

> transfer of credit, efficiency of campus and system operations, duplication of programs and courses, mission delineation, cooperative arrangements, academic quality initiatives, and the effects of a system's proposed plans on the other systems.[45]

The Legislature asked HECB to coordinate the development and operation of a statewide post-secondary graduate followup reporting system. The system "shall include information on all sub-baccalaureate occupational programs and all programs that lead to an occupation requiring certification, licensure, or testing for entry."[46]

Finally, the 1991 Legislature directed the technical college system to create additional joint technical college districts to govern all but the 10 largest colleges. During the next two years, the technical college system reduced its number of colleges from 27 to 18, and encouraged these colleges to review and "realign" their program offerings to improve instructional efficiency and quality.[47]

1992

In 1992, HECB:

- Worked with the higher education systems to update its statewide inventory of degree programs;
- Approved policies for reviewing existing higher education programs; and
- Identified programs inconsistent with the system mission statements adopted by the 1991 Legislature.[48]

In addition, the Legislative Audit Commission authorized the Program Evaluation Division to undertake this study of program duplication, reflecting continued legislative concerns about program efficiency and mission delineation.

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45 Minn. Laws (1991) Ch. 356, Art. 2, Sec. 2.

46 Minn. Laws (1991), Ch. 356, Art. 1, Sec. 2.

47 The 1991 Legislature mandated the community and technical college systems to select a site at which to consolidate administration of two nearby institutions from these systems; the Legislature repealed this requirement in 1992.

48 HECB identified three technical college AAS programs that were not being offered in conjunction with a nearby community college. It asked the state university system to seek legislative clarification of its authority to offer Associate in Arts degrees, and identified several associate degree programs that were not in compliance with HECB guidelines. HECB asked the community college system to discontinue courses that do not transfer to baccalaureate institutions, and to bring the labeling of associate degrees into compliance with HECB guidelines.

Programs in Technical and Community Colleges

CHAPTER 2

Sub-baccalaureate programs generally require two years or less for full-time students to complete, and graduates receive "associate" degrees, certificates, or diplomas. Currently, all four of Minnesota's higher education systems offer sub-baccalaureate programs. Out of 18,357 sub-baccalaureate graduates in 1990-91, 11,017 graduated from the technical colleges, 6,616 from the community colleges, 286 from the state universities, and 438 from the University of Minnesota.[1]

In this chapter, we focus on the programs offered by the technical and community colleges, particularly occupational programs. The state universities have eliminated most of their two-year specialized degree programs, so we limited our review of state university programs to our analysis of duplication.[2] Most of the University of Minnesota's sub-baccalaureate programs are at its Crookston campus, and the University has proposed phasing out all of Crookston's two-year programs starting in Fall 1993.

We asked:

- **What are the student/teacher ratios, cost per student, and placement rates of technical and community college programs? How do they vary among programs and colleges?**

- **To what extent is there program duplication within and among higher education systems? How many of these duplicated programs also have low student/teacher ratios or low placement rates?**

- **How much could be saved by raising student/teacher ratios or reducing unnecessary duplication?**

We found that there is wide variation in student/teacher ratios and placement rates among technical and community college programs. There are many programs and disciplines with low student/teacher ratios or low placement rates. The overall technical college student/teacher ratio has increased somewhat

1 The Waseca campus, which closed in 1992, accounted for 174 of the University's sub-baccalaureate graduates. General College, which stopped offering degrees in 1991, accounted for 80 sub-baccalaureate degrees.

2 Several state universities fulfill a community college role and offer general pre-baccalaureate Associate in Arts degrees.

over the past decade, but the overall ratio for non-health programs is still short of the 17:1 goal we recommended in 1983. We found that 9 percent of technical college programs had student/teacher ratios that were 25 percent or more below the statewide average of comparable programs. Twenty-one percent of non-health programs had less than 14 students per teacher for two consecutive years. Achieving the goal of 17 students per teacher for non-health programs would save about $4 million annually. Community college occupational disciplines had a higher overall student/teacher ratio than technical college programs. Fifteen percent of the community college non-health occupational disciplines had fewer than 14 students per teacher.

We found that there is considerable duplication among technical and community college programs, most of which occurs within each system rather than between systems. Forty-one technical college programs and one community college program duplicated programs within 35 miles and had less than 15 students per teacher. About $0.9 million could be saved annually if non-health programs that duplicate another program within 35 miles had a student/teacher ratio of at least 15:1.[3] In addition, 22 technical college programs and 7 community college programs duplicated another program within 35 miles and had placement rates less than 60 percent.

Recently, the two-year college systems have made initiatives to improve program efficiency and effectiveness, such as the technical college program realignment initiative and the community college student success program. Some colleges have recently adopted more rigorous program review procedures. In September 1992, the State Board for Community Colleges adopted a plan to strengthen program reviews in order to improve program efficiency and effectiveness. And in February 1993, the State Board of Technical Colleges adopted a stricter placement standard and expanded its program review procedures.

In light of the state's current financial condition, it is important for the system office as well as colleges to review program performance. We concluded that the technical and community college governing boards need to adopt tighter placement standards for occupational programs. They also should adopt standards for student/teacher ratios and periodically review programs and disciplines to ensure that they are efficient.

METHODS AND DATA SOURCES

Our analysis of technical and community college programs focused on student/teacher ratios, cost per student, placement rates, and student access.[4]

3 This estimate excludes technical college management programs, which are usually designed to operate at lower ratios.

4 Three-fourths of two-year college programs and disciplines have fewer than three faculty, and some people suggested to us that programs this small may have difficulty achieving the quality or efficiency of larger programs. We chose to focus on more direct measures of program performance, such as student/teacher ratios and placement rates, rather than simply highlighting small programs.

Currently, neither the technical college nor the community college system offices collect wage data on graduates, so we were unable to evaluate the impact of occupational programs on wages.

Data on Cost, Staffing, and Placement

In small programs, student/teacher ratios are the best measure of efficiency.

Our cost analysis was based on direct instructional expenditures, which include faculty salaries and fringe benefits, net equipment and supply expenditures, travel, and purchased services. They do not include spending on administration, student services, facilities, and libraries.[5]

Because most technical and community college programs and disciplines have three or fewer full-time-equivalent faculty, cost comparisons are affected by the differences in experience and academic preparation among faculty. Program and discipline costs may be low or high merely because an instructor is at the bottom or top of the salary scale. Over time, salary differences will change as new instructors are hired and others gain seniority or leave. In contrast, student/teacher ratios are a more stable measure of efficiency for small programs. As a result, we primarily used student/teacher ratios to examine the costs of sub-baccalaureate programs.

We defined student/teacher ratios as full-year equivalent (FYE) student enrollment divided by the number of full-time-equivalent (FTE) instructors. For both systems, the reported student/teacher ratios may underestimate the actual student/teacher ratios. Technical college instructors may be reported as teaching full-time even if they perform some non-instructional activities. Full-time-equivalents for some community college instructors may be overstated for certain instructional activities such as individual instruction. Overall, however, state board staff consider the student/teacher data to be reliable.

Student/teacher ratios for individual programs and disciplines may fluctuate from year to year due to changes in the economy or in student interest. Consequently, we examined ratios for individual years as well as two and three year averages. We looked at the fiscal implications of selected improvements in efficiency. Because this chapter examines potential savings using various staffing standards (such as bringing all individual programs up to a minimum ratio of 14:1 or raising the systemwide ratio to 17:1), there is some overlap in our savings estimates. Therefore, readers should not simply add our various estimates to determine cumulative savings.

We analyzed placement rates for technical and community college programs based on data from the student followup systems used by each system. Community college liberal arts and science programs are designed for transfer and not for immediate employment. Since most community colleges do not not collect followup data on graduates of these programs, we limited our analysis

5 Community colleges report non-personnel costs by 26 broad discipline categories rather than by specific programs, and we used this information to estimate costs for individual disciplines. However, since non-personnel costs are only five percent of total direct instructional costs, this was a minor limitation for analysis of most disciplines.

of graduate followup to occupational programs. We did not evaluate rates of student transfer into baccalaureate programs for community college Associate in Arts degree programs because community colleges have not assessed individual students' intent to transfer. Also, it is more difficult to determine the success of students in transfer programs because some choose to wait several years before seeking a baccalaureate degree.

To analyze placement rates by individual program, we used three-year-average placement rates to minimize chance fluctuations from year to year. Many programs do not have enough graduates in a single year to obtain a reliable placement measure. In addition, placement rates may fluctuate due to temporary economic conditions.

All of the data we collected are regularly reported by technical and community colleges to their system offices. To supplement these data, we interviewed officials from the state board offices, colleges, and the Higher Education Coordinating Board (HECB). We also reviewed college catalogs that describe college programs and courses.

Prior to fiscal year 1992, technical colleges reported enrollment, staffing, and financial data by college but not by campus. As a result, our units of analysis were 30 colleges that existed in fiscal years 1989 through 1991. These included two multi-campus colleges (Hennepin and Southwestern). For fiscal year 1992, student/teacher data was reported for all 34 campuses, but financial data was reported at the college level (27 colleges, including four regional colleges -- Hennepin, Southwestern, Riverland, and Brainerd/Staples). As the number of regional technical colleges has increased from two to eight during the past two years, it has become more important to analyze programs by campus. The technical colleges will start reporting financial data by campus for fiscal year 1993.

Definition of "Program"

As we explained in Chapter 1, there are different ways of defining a college program. One way is to count each type of degree or diploma awarded at each campus as a program. For example, each of the following would be counted as a separate program: a one-year general secretary diploma, a two-year general secretary diploma, a two-year legal secretary diploma, and an Associate in Applied Science (AAS) degree for legal secretary.[6]

Based on this definition, technical colleges have about 1,400 occupational programs and community colleges have about 300 occupational programs.[7] The

6 The AAS degree differs from a two-year diploma in that it requires at least 32 credits of general education. Technical colleges usually offer these degrees as joint programs with community colleges or state universities.

7 Most community college students graduate with Associate in Arts (AA) degrees, which are liberal arts degrees that are not intended to specialize in particular disciplines.

average number of programs per campus is about 41 for technical colleges and 14 for community colleges.[9]

We aggregated similar programs to evaluate efficiency and effectiveness.

We think that this definition of program is too narrow for an analysis of program efficiency and effectiveness. Colleges often award several degrees that require many of the same courses, so it makes sense to look at these programs in combination. Thus, in the remainder of this chapter, we define programs according to broader classifications developed by each system.[10] These broader classifications do not make distinctions based on program length, and they often combine related types of diplomas. For example, the secretarial category used by the technical colleges includes general secretary, legal secretary, medical secretary, and clerk-typist programs. Other program clusters for technical colleges include accounting careers, retail/wholesale marketing careers, culinary arts careers, and machine tool careers.[11] For community colleges, we used program clusters for the following areas: secretarial, business/marketing, and accounting.[12]

Based on this broader definition, technical colleges offer 759 programs and community colleges offer 153 occupational programs. The average number of occupational programs per campus is 22 for technical colleges and 7 for community colleges.

To determine whether a program duplicated another program, we used the first six digits of the national Classification of Instructional Programs system in most cases. This classification system is generally consistent with the classifications used by the technical and community college systems. Its main advantage is that it classifies technical and community college programs under the same coding system. In selected cases (for example, secretarial programs), we assessed program duplication according to the broader program categories used by the technical and community college systems because of the considerable overlap among related, specialized programs.

In our analysis of program staffing, we analyzed student/teacher ratios of each discipline, as opposed to the average ratio of all courses taken by students to complete a degree or diploma in a particular field. Thus, for example, the ratios reported for the accounting discipline do not reflect the courses in related fields or general education that a student might complete to earn an accounting degree.[13] Community college associate degrees in occupational fields require

9 Several programs are jointly offered by technical and community colleges. Since the technical college provides the technical component and the community college provides the general education, we counted these joint programs as technical college programs.

10 We made some revisions in the systems' broad classifications to make the program categories more consistent among colleges.

11 Placement data are reported for programs grouped into smaller categories (such as legal secretary). But we combined the placement data to match the categories used by the financial and student/staff data.

12 Courses in these areas may be taken by students who are pursuing occupational degrees, by students who are pursuing general degrees, or by students who take only a few courses in those areas.

13 General studies and liberal arts disciplines typically have higher ratios than specialized or technical fields.

coursework in the occupational discipline (from 25 to 67 percent of all coursework), in related disciplines (from 15 to 25 percent), and in general education (from 33 to 50 percent). For example, a student in a secretarial program typically takes courses from related disciplines such as accounting and business, as well as general education courses (liberal arts and sciences).

In some occupational fields, community colleges offer courses but not degrees. For example, 19 community colleges offer accounting courses even though only eight colleges offer associate degrees in accounting and an additional two colleges offer one-year programs. Colleges that do not offer accounting degrees may offer accounting courses to meet the needs of students in other degree programs. We included these disciplines in our analysis of student/teacher ratios, regardless of whether a degree in the same field was offered.

Technical college programs also require students to take courses in related disciplines and in general education, though usually to a lesser extent. Students pursuing Associate in Applied Science degrees typically take 33 percent of their coursework in liberal arts and sciences at a nearby community college or state university. Students in diploma programs typically take between 10 and 20 percent of their coursework in "general studies."

PROGRAM COSTS AND STAFFING

In fiscal year 1992, technical colleges spent $137.5 million on direct instruction and community colleges spent $67.2 million.[14] As Table 2.1 shows, direct instructional spending was 55 percent of total operating expenses for the technical colleges and 43 percent for the community colleges. The largest

Table 2.1: Technical and Community College Operating Expenditures, Fiscal Year 1992

	Technical Colleges		Community Colleges	
	Amount (in millions)	Percent	Amount (in millions)	Percent
Direct Instruction	$137.5	54.7%	$67.2	42.7%
Salaries and Benefits	105.7	42.0	63.7	40.5
Equipment and Supplies	21.0	8.4	3.5	2.2
Other	10.8	4.3		
Other Operating[a]	113.9	45.3	90.0	57.3
Total	$251.4	100%	$157.2	100%

Source: Program Evaluation Division analysis of technical and community college data.

[a]Includes facilities, college administration, student services, libraries, system office, student activities, and miscellaneous expenditures.

14 Direct instructional spending includes expenditures that can be directly attributed to specific instructional programs. Direct instructional spending excludes spending for administration, student services, libraries, and facilities.

component, faculty salaries and fringe benefits, was about 74 percent of direct instructional spending for technical colleges and 95 percent for community colleges. Technical colleges spent 15 percent of direct instructional expenditures on equipment and supplies, while community colleges spent less than 5 percent.

Since colleges spend most of their instructional resources on faculty salaries and benefits, student/teacher ratios significantly affect instructional spending. In this section, we review how instructional programs are funded and examine the student/teacher ratios and costs of technical and community college programs.

Occupational fields often require smaller class sizes than academic fields.

Comparisons of costs and student/teacher ratios among technical and community college programs should be made with caution. Technical colleges offer occupational programs only, while community colleges offer both occupational and academic coursework.[15] By their nature, occupational programs tend to require more equipment expenditures than academic programs. Occupational programs also tend to use more labs, resulting in smaller class sizes than those of lecture classes commonly used in academic disciplines. Some health-related occupational courses have maximum class sizes in order to meet accreditation requirements. As a result, we have tried to compare student/teacher ratios among similar programs.

Some technical college officials maintain that, compared with other systems, technical colleges have more students who are handicapped or have weak academic skills, and who, as a result, require more personal attention from faculty. Both technical and community colleges have open admission policies, unlike universities, so they attract more students who need remedial education. However, according to Higher Education Coordinating Board (HECB) staff, there is not adequate data to make valid comparisons between the technical and community colleges.

Technical and Community College Funding

Technical and community college programs are financed almost entirely with state appropriations and student tuition. Under the state's average cost funding formula, each higher education system receives state appropriations based on its mix of programs and the number of FYE students. The technical college system receives more funds per student than the community college system because it has more high cost programs.

Each system determines how to allocate funds to individual colleges. The technical and community college systems have allocation formulas which determine the amount of state funds for each college program as well as other expenditure categories such as administration. The systems use these detailed allocation formulas solely to determine the colleges' total funding, and not to

15 In fiscal year 1991, 44 percent of community college graduates earned occupational degrees.

prescribe how the colleges should spend the funds. Each college decides how to distribute its allocation among its programs.[16]

The technical and community college systems both have efficiency incentives in their fund allocation formulas.

The allocation formulas are designed to encourage colleges to operate efficiently. Under the technical college formula, the amount of funds a college receives for instructional programs depends primarily on the college's student enrollment and its program mix. For each program, the formula determines the number of faculty positions to fund by dividing the number of FYE students by the system's three-year-average student/teacher ratio for that program category. For example, the system average student/teacher ratio for auto mechanics programs was about 15:1. If a college had 45 FYE students in 1992, it would receive funding for three positions in 1994 regardless of how many teachers it actually employs. Thus, colleges with above-average student/teacher ratios in a program have additional funds to spend on other programs, activities, or salaries. Colleges with below-average student/teacher ratios have less to spend.[17]

Overall, we think that the technical college system has a reasonable allocation formula. In some cases, however, the formula lacks incentives for colleges to operate efficiently. There are many program categories for which only one or two colleges have programs. In such cases, the amount of state funds a college receives for a program depends largely on the college's average student/teacher ratio for that program during the past three years. Currently, the allocation formula funds all program categories with statewide student/teacher ratios less than 10:1 at a 10:1 rate. To improve the formula's incentive for efficiency, we recommend that:

- **The technical college system should revise its state aid allocation formula by setting a higher minimum funding ratio for instructional programs.**

Under the community college allocation formula, the amount of state appropriations a college receives for instructional programs also depends on the number of students and the college's program mix. The main difference from the technical college funding approach is that community colleges receive different amounts per student, depending on their overall student enrollment. In most liberal arts and occupational disciplines, the formula funds one faculty position per 28 students for the largest colleges, and about one position per 21 students for the smallest college. Disciplines that are designed to operate at lower student/teacher ratios receive funding at different levels. For example, most health disciplines receive funding based on one faculty position for every

16 The only restriction is that colleges cannot move state appropriations among certain funds. For example, the technical colleges cannot move appropriations among the general fund (covering regular instruction, administration, and student services), the equipment fund, and the fund for hour-based (extension) offerings.

17 To determine the actual allocation amount, the formula multiplies the number of funded positions by an average compensation rate (including an inflation factor adjustment), and then subtracts the tuition revenue factor. The compensation rate is determined by adjusting the system's average salary and fringe benefit level by 25 percent of the difference between the college average and the system average.

10 students. Selected other disciplines receive funding based on ratios of 15:1 or 20:1. These low-ratio programs account for six percent of the system's full-year-equivalent enrollment. The formula adjusts the allocation for a variety of other factors, including teacher length of service and special student needs. Overall, we think that the community college system has a reasonable allocation formula.

Comparisons Between Technical and Community College Systems

In 1992, direct instructional spending per full-year-equivalent (FYE) student was $3,562 for technical colleges and $2,000 for community colleges. The main reason that community colleges have lower costs per student is that they have higher student/teacher ratios than the technical colleges. In 1992, technical colleges had a student/teacher ratio of 15.9:1, compared with 17.6:1 for community college occupational disciplines. Community college academic disciplines had an average ratio of 26.1:1, and the overall community college student/teacher ratio was 23.7:1.

Another significant reason that technical colleges have higher costs per student is that they have higher equipment costs. In fiscal year 1992, technical colleges spent $544 per student on equipment and supplies, compared with $104 per student for community colleges.

Both systems offer accounting, secretarial, and practical nursing programs.

Community colleges have a different mix of occupational programs than technical college programs. As a result, we looked at student/teacher ratios for programs and disciplines taught in both systems. Table 2.2 shows the student/teacher ratios for some of the more common programs and disciplines. We found that:

- **Community colleges have higher student/teacher ratios for accounting and secretarial disciplines, and they have lower ratios for practical nursing disciplines.**

We estimated that the state would have saved $1.6 million in 1992 if technical college accounting and secretarial programs operated at the student/teacher ratios of comparable disciplines in community colleges.[18] The state would have saved about $200,000 if community college practical nursing disciplines operated at the average ratio of similar programs in technical colleges. In the remainder of this section, we examine the student/teacher ratios of each system in more detail.

18 These estimates assume that the number of students remains the same, and that colleges cut the number of faculty positions to reach the student/teacher ratio of community colleges. The estimated savings include $1.0 million for accounting programs and $0.6 million for secretarial programs. These annual savings would not be achieved immediately because colleges would incur expenses from faculty layoffs and would cut faculty with below average salaries.

Table 2.2: Student/Teacher Ratios for Selected Technical and Community College Programs, Fiscal Year 1992

Program	Number of Programs or Disciplines		Full-Year-Equivalent Enrollment		Student/Teacher Ratios	
	Technical Colleges	Community Colleges	Technical Colleges	Community Colleges	Technical Colleges	Community Colleges
Secretarial	28	18	2,731	558	16.0	17.3
Accounting	25	19	1,484	945	17.6	24.2
Practical Nursing	21	4	2,260	118	15.6	9.3

Source: Program Evaluation Division analysis of technical and community college data.

Technical College Programs

State law used to mandate technical college efficiency standards.

In our 1983 report on technical colleges, we found that there were many programs with low student/teacher ratios and recommended that technical colleges achieve a systemwide student/teacher ratio of 17:1 in non-health programs and 12:1 in health programs. Subsequently, the 1983 Legislature required that "in the absence of compelling reasons to do otherwise, the state board shall eliminate a program if ... the [student/teacher] ratio is significantly below 12:1 for a health program or 17:1 for a non-health program."[19] The 1985 Legislature eliminated this requirement and instead required the state board to set its own student/teacher ratio standards. Subsequently, the State Board of Technical Colleges adopted student/teacher ratio standards of 14:1 for non-health programs and 10:1 for health programs. After reviewing programs that did not meet these standards for two consecutive years, the board would grant a variance, monitor the program, reduce staff, or suspend the program. The 1990 Legislature removed the requirement to have student/teacher ratio standards, and subsequently, the state board stopped formally reviewing programs with low student/teacher ratios. Instead, the board changed its allocation formula in order to strengthen incentives for colleges to operate efficiently.

To determine how these actions affected student/teacher ratios, we examined the trend in student/teacher ratios for the past 10 years. To a large extent, student/teacher ratios are determined by the management practices of individual colleges. However, they are also affected by systemwide trends in state funding, tuition, and student enrollment.[20]

Table 2.3 shows the trend in student/teacher ratios between fiscal years 1979 and 1992. The overall student/teacher ratio increased from 12.8 in 1979 to

19 Minn. Laws (1983), Ch. 314, Art. 5, Sec. 4, Subd. 1 and 2.

20 To make data comparable over time, we removed student and faculty counts from programs on Indian reservations, programs in prisons, and management programs. These programs tend to have low student/teacher ratios and student enrollment in these programs has increased significantly during this time period.

Technical college student/teacher ratios reached a high of more than 16 to 1 in 1986.

Table 2.3: Technical College Student/Teacher Ratios, Fiscal Years 1979-92

Fiscal Year	Full-Year-Equivalent Enrollment	Student/Teacher Ratio
1979	31,003	12.8
1980	31,713	13.3
1981	34,363	14.2
1982	34,977	14.3
1983	35,455	15.2
1984	35,175	15.6
1985	32,895	15.6
1986	32,169	16.2
1987	31,348	16.1
1988	30,283	16.0
1989	30,086	15.6
1990	29,804	15.3
1991	30,556	15.9
1992	30,344	15.9

Note: Figures exclude students and teachers in hour-based programs, farm-business management programs, small business management programs, programs on Indian reservations, and programs in prisons.

Source: Program Evaluation Division analysis of technical college data.

15.9 in 1992, an increase of 24 percent. Much of this increase occurred prior to the 1983 legislation, a period of rising student enrollment. The student/teacher ratio for 1983 was 15.2, an increase of 19 percent over the 1979 ratio. Even though student enrollment stopped increasing after 1983, student/teacher ratios continued to increase, reaching 16.2 in 1986. This increase was likely due to the combined effect of budget cuts by the Legislature and stricter student/teacher ratio policies of the state board.

After 1986, student/teacher ratios slowly declined to 15.3 in 1990, before increasing again to 15.9 in 1992. The increase between 1990 and 1992 came after the state board stopped reviewing student/teacher ratios and adopted a new allocation formula. The reason for the increase appears to be tighter budgets and/or the new allocation formula. Several administrators told us that tight budgets are making college officials watch student/teacher ratios more closely.

Table 2.4 presents technical college student/teacher ratios for broad occupational areas. Areas with the highest ratios in fiscal year 1992 were Agriculture (16.7), Business/Office (16.6) and Trade and Industry (16.3). Areas with the lowest ratios were Home Economics (14.6), Technical (14.7), and Marketing (14.8). The student/teacher ratio for health programs (15.1) was considerably higher in 1992 than it was during the 1980s. From 1979 through 1985, the student/teacher ratio for health programs remained below 12:1. But as student demand for health programs has rapidly grown, so have their student/teacher ratios. Between 1989 and 1992, student enrollment in health programs increased by 45 percent and student/teacher ratios went from 12.9 to 15.1.

Table 2.4: Technical College Student/Teacher Ratios by Instructional Area, Fiscal Year 1992

Instructional Area	Full-Year-Equivalent Enrollment	Student/Teacher Ratio
Agriculture	672	16.7
Marketing	1,665	14.8
Health	4,405	15.1
Home Economics	1,587	14.6
Business/Office	5,176	16.6
Technical	3,505	14.7
Trade/Industrial	10,196	16.3
General Studies	3,137	17.5
Subtotal	30,344	15.9
Management	1,385	9.9
Total	32,019	15.5

Note: This table excludes students and teachers in hour-based (extension) programs, programs on Indian reservations, and programs in prisons.

Source: Program Evaluation Division analysis of technical college data.

There are no absolute standards for evaluating student/teacher ratios, and there is little research on the relationship between student/teacher ratios and the effectiveness of technical college programs. As a result, we used a variety of standards to assess the efficiency of technical college programs. First, when possible, we compared technical college programs with similar community college programs. These results were presented earlier in this chapter. Second, we used standards that have been used in the past to review programs, including minimum ratios of 10:1, 12:1, and 14:1. Finally, we compared student/teacher ratios of individual programs with statewide averages of similar programs.

21 percent of technical college programs had fewer than 14 students per teacher.

Table 2.5 shows the number of programs with student/teacher ratios below 10:1, 12:1, and 14:1 for two consecutive years (fiscal years 1991 and 1992).[21] We found that:

- **21 percent of technical college programs had student/teacher ratios less than 14:1 in both fiscal years 1991 and 1992. During the same two years, 8 percent had student/teacher ratios less than 12:1 and 3 percent had student/teacher ratios less than 10:1.**

These low-ratio programs come from a variety of occupational areas. Health programs were less likely to have low student/teacher ratios than most of the

21 Our analysis excludes programs that were closed as of Fall 1992, management programs, and programs designed for special needs students.

Table 2.5: Number of Technical College Programs With Low Student/Teacher Ratios, Fiscal Years 1991-92

Occupational Area	Number of Active Programs	Number of Programs With Student/Teacher Ratios Less Than: 10:1	12:1	14:1	Percent of Programs With Student/Teacher Ratios Less Than: 10:1	12:1	14:1
Agriculture	21	0	3	6	0%	14%	29%
Marketing	62	5	9	18	8	15	29
Health	95	1	6	23	1	6	24
Home Economics	44	3	6	11	7	14	25
Business and Office	82	2	4	11	2	5	13
Technical	101	6	12	25	6	12	25
Trade and Industry	232	4	13	41	2	6	18
Total	637	21	53	135	3%	8%	21%

Note: The table includes programs with student/teacher ratios below the applicable threshold for both fiscal years 1991 and 1992. It excludes management programs and 11 programs with ratios less than 14:1 that have since been closed.

Source: Program Evaluation Division analysis of technical college data.

other occupational areas, including marketing, agriculture, home economics, and technical. Table 2.6 lists individual programs with student/teacher ratios less than 10:1.

We also examined how the number of programs with low student/teacher ratios has changed since the early 1980s. We found:

- **Between 1980-81 and 1991-92, the percent of programs with student/teacher ratios less than 10:1 for two consecutive years declined from 6 percent to 3 percent.**

A second way to identify programs with low student/teacher ratios is to compare ratios of individual programs with the state average for the same program category. As Table 2.7 shows:

- **Student/teacher ratios for 63 programs (9 percent of technical college programs) were 25 percent or more below the state average.**

Table 2.8 summarizes how student/teacher ratios for the most common programs compared with the state average. Programs with student/teacher ratios 25 percent or more below the state average included 5 culinary arts programs, 3 auto mechanic programs, 3 small business programs, 3 computer career programs, and 3 carpentry programs. Table 2.9 lists individual programs that were more than 33 percent below the state average.

Table 2.6: Technical College Programs With Student/Teacher Ratios Less Than 10:1 for Two Consecutive Years, Fiscal Years 1991 and 1992

		Student/Teacher Ratios		Student FYE	
College	Program	FY 92	FY 91	FY 92	FY 91
Hennepin	Auto Parts Manager-(ADEPT)-AAS	5.5	8.2	7.1	10.7
Dakota County	Finance and Credit Management	5.9	5.3	5.1	6.4
Staples	Culinary Arts Careers[a]	6.3	8.7	6.3	9.6
Anoka	Mechanical Drafting	7.0	6.6	20.0	9.9
Hutchinson	Artificial Intelligence Technology-AAS	7.1	5.2	7.5	9.8
Southwestern	Culinary Arts Careers	7.8	4.9	7.3	3.9
Southwestern	Dental Assistant	7.9	7.8	16.3	19.5
Detroit Lakes	Diesel Mechanics	7.9	9.9	16.3	20.8
Detroit Lakes	Architectural Drafting	8.0	5.9	16.5	12.3
Wadena	Advertising	8.2	8.6	10.3	10.3
Dakota County	Property Management	8.6	6.1	9.1	6.1
Hennepin	Bio-Medical Equipment Technician	8.7	9.0	7.3	9.9
Red Wing	Arena and Recreational Facility Management	8.8	9.5	10.7	10.5
Staples	Radio Broadcasting Technician-AAS	8.8	6.9	8.8	7.6
Southwestern	Court Reporting	8.9	9.4	11.9	16.0
Pine City	Locksmithing Technician	9.3	7.6	16.2	13.0
Dakota County	Automotive Technician (ASEP/ASSET)-AAS	9.4	9.5	21.4	21.9
Hutchinson	Metrology Technology	9.4	7.3	21.8	11.0
Northeast Metro	Dietetic Technician-AAS	9.6	7.7	13.3	10.8
Winona	Supervisory Management-AAS	9.8	8.0	14.8	8.0
Northeast Metro	Purchasing and Inventory Management	9.9	9.9	8.8	8.9

Note: Excludes management programs. There were seven other programs that had student/teacher ratios less than 10 that have since been closed.

Source: Program Evaluation Division analysis of technical college data.

[a]Will be closed in fiscal year 1994.

Table 2.7: Student/Teacher Ratios of Technical College Programs Compared With Statewide Average of Similar Programs

Student/Teacher Ratio Compared With State Average	Number of Programs	Percent
40 percent or more below average	17	2.4%
25 to 40 percent below average	46	6.6
10 to 25 percent below average	121	17.3
Within 10 percent of state average	333	47.6
10 to 25 percent above average	115	16.4
25 to 40 percent above average	47	6.7
40 percent or more above average	21	3.0

Note: Two-year average student/teacher ratios, fiscal years 1991 and 1992. Includes only programs that were operating in both 1991 and 1992 and are still active.

Source: Program Evaluation Division analysis of technical college data.

Table 2.8: Distribution of Student/Teacher Ratios for Selected Technical College Programs, Two-Year Average, Fiscal Years 1991-92

Program Category	Number of Programs	State Average Student/Teacher Ratio	Number of Programs With Student/Teacher Ratios That Are: Below State Average By: Over 40 Percent	25 to 40 Percent	10 to 25 Percent	Within 10 Percent of State Average	Above State Average By: 10 to 25 Percent	25 to 40 Percent	Over 40 Percent
Secretarial	28	15.9	1	0	6	12	6	3	0
Accounting Careers	25	18.2	0	1	5	13	6	0	0
Auto Mechanics	25	15.1	0	3	6	7	5	3	1
Small Business Management	25	9.4	3	0	4	11	4	3	0
Practical Nursing	21	15.2	0	0	3	12	4	1	1
Machine Tool Careers	19	16.0	0	0	6	7	6	0	0
Farm Business Management	19	11.0	0	1	3	11	4	0	0
Wholesale Retail Marketing Careers	19	14.3	0	1	6	7	5	0	0
Welding	19	16.0	0	1	6	6	2	4	0
Computer Careers	16	16.8	0	3	3	6	1	3	0
Carpentry	16	15.7	0	3	3	3	5	1	1
Auto Body Repair	16	15.1	0	2	4	4	6	0	0
Mechanical Drafting	16	14.4	1	0	4	7	2	1	1
Electronics Technology	15	15.7	0	1	4	4	4	1	1
Culinary Arts Careers	15	14.1	4	1	1	4	3	2	0
Diesel Mechanics	13	15.1	1	1	4	1	3	3	0
Graphic Arts	11	15.5	1	1	2	3	4	0	0
Construction Electrician	10	18.8	0	0	4	2	3	1	0
Architectural Drafting	10	17.7	1	1	1	3	3	0	1
Dental Assistant	10	13.1	0	1	1	4	2	2	0
Nurse Assistant	10	14.6	0	2	2	5	1	0	0

Source: Program Evaluation Division analysis of technical college data.

Table 2.9: Technical College Programs With Student/Teacher Ratios 33 Percent or More Below the State Average of Similar Programs, Two-Year Average, Fiscal Years 1991-92

College	Program	Student/Teacher Ratio: Two-Year Average	Percent Below State Average	FYE Students in FY 92
Albert Lea	Occupational Skills	2.7	67%	3.0
Dakota County	Finance and Credit Management	5.6	62	5.1
Southwestern	Financial Services Careers	7.5	61	3.7
Detroit Lakes	Architectural Drafting	6.9	61	16.5
St. Cloud	Small Business Management	3.7	61	3.8
Southwestern	Culinary Arts Careers	6.4	54	7.3
Anoka	Mechanical Drafting	6.8	52	20.0
Wadena	Advertising	8.4	51	10.3
Dakota County	Culinary Arts Careers	7.0	50	12.9
St. Paul	Small Business Management	4.9	48	15.4
Willmar	Small Business Management	4.9	48	5.5
Austin	Administrative Support Careers	8.3	48	36.8

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Table 2.9: Technical College Programs With Student/Teacher Ratios 33 Percent or More Below the State Average of Similar Programs, Two-Year Average, Fiscal Years 1991-92, continued

College	Program	Student/Teacher Ratio: Two-Year Average	Student/Teacher Ratio: Percent Below State Average	FYE Students in FY 92
Staples	Culinary Arts Careers	7.6	46	6.3
Detroit Lakes	Diesel Mechanics	8.9	41	16.3
Mankato	Graphic Arts	9.2	40	5.0
Southwestern	Dental Assistant	7.8	40	16.3
Austin	Computer Careers	10.1	40	6.7
Bemidji	Nurse Assistant	10.1	39	14.9
Southwestern	Welding	9.9	38	7.9
Winona	Building Utilities Technician	10.5	38	13.3
Winona	Supervisory Management-AAS	9.1	36	14.8
Dakota County	Computer Careers	10.7	36	31.1
Winona	Marine and Small Engine Mechanic	10.2	35	10.4
St. Paul	Auto Mechanics	9.8	35	33.0
Northeast Metro	Horticulture Technology Careers	11.6	35	7.3
St. Paul	Health Unit Coordinator	11.7	35	17.7
Austin	Cosmetology	9.9	34	24.9
Minneapolis	Wholesale/Retail Marketing Careers	9.4	34	11.6
Southwestern	Auto Mechanics	10.0	34	50.2
Southwestern	Carpentry	10.4	34	38.9

Note: There were four other programs that were more than 33 percent below the state average and have since been closed.

Source: Program Evaluation Division analysis of technical college data.

Community College Disciplines

As we showed earlier in this section, community colleges have higher overall student/teacher ratios than technical colleges. The State Board for Community Colleges promotes efficiency through its allocation formula and its college review process, which includes a review of student/teacher ratios of individual disciplines every two years. The community college system does not have formal student/teacher ratio standards for disciplines. Its policy is to fund large colleges at high student/teacher ratios in order to operate small colleges at lower ratios. While the Legislature required the technical college system to set student/teacher ratio standards during the 1980s, it made no similar requirements for the community college system.

As with the technical colleges, we compared student/teacher ratios of individual disciplines with various thresholds and the state average. In our analysis, we included discipline areas for which colleges provide coursework, but do not offer specialized degrees.

Table 2.10 shows student/teacher ratios of broad discipline areas for fiscal year 1992. Liberal arts and sciences had the highest ratio (26.1:1). All four non-health occupational areas had ratios over 20:1. Public service occupations had an average ratio of 24.8:1, followed by business, office, and marketing (22.4:1), engineering and mechanical technologies (21.6:1), and natural resource technologies (21.5:1). Health disciplines averaged 10 students per teacher.

Community college occupational categories other than health had more than 21 students per teacher.

Table 2.10: Community College Student/Teacher Ratios By Instructional Area, Fiscal Year 1992

Instructional Area	Full-Year-Equivalent Enrollment	Student/Teacher Ratio
Occupational Disciplines	6,374	17.6
Business, Office, and Marketing	3,384	22.4
Health	1,490	10.0
Public Services	971	24.8
Engineering and Mechanical Technologies	409	21.6
Natural Resource Technologies	121	21.5
Liberal Arts and Sciences	25,542	26.1
Skills Training	718	18.9
Total	32,634	23.7

Source: Program Evaluation Division analysis of community college data.

Table 2.11 shows the number of occupational programs with student/teacher ratios below 10:1, 12:1, and 14:1 for two consecutive years (fiscal years 1991 and 1992). Since many health programs are designed to operate at ratios around 10:1, we examined health programs separately. We found that:

- **Fifteen percent of occupational non-health disciplines had student/teacher ratios less than 14:1, and four percent had student/teacher ratios less than 10:1.**

Table 2.12 compares student/teacher ratios of individual disciplines with the state average for comparable community college disciplines. We found that:

- **Seventeen percent of community college occupational disciplines had student/teacher ratios that were 25 percent or more below the state average.**

Occupational disciplines that were 25 percent or more below the state average included six accounting disciplines, five business disciplines, and three human services disciplines. Student/teacher ratios ranged from 12:1 to 34:1 for accounting disciplines, from 10:1 to 32:1 for business disciplines, and from 11:1 to 22:1 for secretarial disciplines. Much of this variation is related to differences in size among community colleges. For each of these disciplines, we found the smallest student/teacher ratios in one of the smallest colleges.

Table 2.11: Number of Community College Disciplines With Low Student/Teacher Ratios, Fiscal Years 1991 and 1992

Discipline Area	Number of Active Disciplines	Number of Disciplines With Student/Teacher Ratios Less Than: 10:1	12:1	14:1	Percent of Disciplines With Student/Teacher Ratios Less Than: 10:1	12:1	14:1
NON-HEALTH OCCUPATIONAL DISCIPLINES	123	5	10	18	4%	8%	15%
-Business, Office, and Marketing	73	0	4	9	0	5	12
-Public Services	33	1	1	3	3	3	9
-Engineering and Mechanical Technologies	15	4	5	6	27	33	40
-Natural Resource Technologies	4	0	0	0	0	0	0
LIBERAL ARTS AND SCIENCES	509	21	36	50	4	7	10
Total	632	26	46	68	4%	7%	11%

Note: The table includes programs with student/teacher ratios below the applicable threshold for both fiscal years 1991 and 1992. It excludes health programs. There were three other programs with student/teacher ratios less than 14:1 that have since been closed.

Source: Program Evaluation Division analysis of community college data.

Table 2.12: Distribution of Student/Teacher Ratios for Selected Community College Disciplines, Three-Year Average, Fiscal Years 1990-92

	Number of Disciplines	State Average Student/Teacher Ratio	Number of Programs With Student/Teacher Ratios That Are: Below State Average By: Over 40 Percent	25 to 40 Percent	10 to 25 Percent	Within 10 Percent of State Average	Above State Average By: 10 to 25 Percent	25 to 40 Percent	Over 40 Percent
OCCUPATIONAL DISCIPLINES									
Business, Marketing, and Mgmt.	19	26.0	2	2	7	5	3	0	0
Accounting	19	24.9	3	5	3	4	2	2	0
Secretarial	17	16.9	0	2	6	6	0	3	0
Nursing (RN)	13	9.6	0	1	4	3	5	0	0
Human Services	12	19.8	0	4	0	4	2	1	1
Law Enforcement	10	32.1	1	1	3	2	2	0	1
LIBERAL ARTS AND SCIENCES									
English	21	23.1	0	0	5	13	3	0	0
Mathematics	21	27.2	2	3	9	5	1	1	0
Psychology	21	37.4	0	3	8	8	0	1	1
Biology	21	28.4	1	4	5	9	0	1	1
Sociology	21	35.6	1	1	10	6	1	0	2
Speech	21	25.3	0	1	10	7	3	0	0
History	21	32.3	1	2	5	7	5	1	0
Economics	21	34.7	4	0	7	5	3	1	1
Art	21	20.9	0	2	6	10	2	1	0
Computer Science	21	22.0	3	3	5	6	2	1	1
Physical Education	21	20.9	1	3	4	9	2	1	1
Political Science	21	31.8	2	5	3	7	3	1	0
Health	20	31.5	0	4	6	6	3	1	0
Foreign Languages	20	17.7	3	2	7	5	2	0	1
Philosophy	20	33.1	3	3	5	6	2	1	0

Table 2.12: Distribution of Student/Teacher Ratios for Selected Community College Disciplines, Three-Year Average, Fiscal Years 1990-92, continued

	Number of Disciplines	State Average Student/Teacher Ratio	Number of Programs With Student/Teacher Ratios That Are: Below State Average By: Over 40 Percent	25 to 40 Percent	10 to 25 Percent	Within 10 Percent of State Average	Above State Average By: 10 to 25 Percent	25 to 40 Percent	Over 40 Percent
Physics	20	18.0	7	1	1	3	2	2	4
Music	20	20.4	3	3	3	5	4	0	2
Chemistry	19	20.4	1	3	6	5	2	1	1
Theatre	19	25.5	5	2	3	6	1	0	2
Geography	15	30.1	3	0	4	3	1	1	3
Anthropology	15	33.3	4	1	4	1	2	2	1
Engineering	14	10.2	4	2	2	2	2	0	2
Humanities	12	30.1	3	1	2	3	1	2	0
Natural Science	11	29.6	1	3	1	2	3	1	0
Journalism	11	13.3	4	1	1	2	0	1	2

Source: Program Evaluation Division analysis of community college data.

Staffing ratios within academic disciplines varied widely among community colleges.

Nevertheless, there is also variation among the large colleges in the Twin Cities area. For example, among the six colleges in the Twin Cities, student/teacher ratios ranged from 21:1 to 34:1 for accounting disciplines, from 22:1 to 32:1 for business disciplines, and from 16:1 to 22:1 for secretarial disciplines.

We also found that student/teacher ratios for liberal arts and science disciplines varied widely among community colleges. For example, three colleges averaged 15 students per teacher in economics courses in recent years, while two colleges averaged over 40 students per teacher. Four campuses averaged less than 11 students per teacher in foreign languages, while one college averaged 26 students per teacher. Other fields with wide variation in student/teacher ratios included biology (16:1 to 42:1), physics (7:1 to 26:1), sociology (17:1 to 76:1), and geography (14:1 to 51:1). While the statewide student/teacher ratio for academic disciplines was 26:1, we found that about 10 percent of academic disciplines at individual colleges had less than 14 students per teacher for two consecutive years (1991 and 1992). Appendix B compares the cost per student of community colleges with state universities and the University of Minnesota for selected disciplines.

Colleges with low student/teacher ratios in certain disciplines tend to have few faculty in these fields. In liberal arts and sciences, we found that only about three percent of community college full-time-equivalent faculty teach in fields with less than 14 students per teacher for two consecutive years. The disciplines with low student/teacher ratios are mostly offered by the smaller colleges. Although community colleges need to have coursework in many disciplines in order to provide comprehensive liberal education, we think that the system office should periodically review disciplines with low student/teacher ratios.

Implications

During the past 12 years, technical colleges have achieved somewhat higher student/teacher ratios and have reduced the number of programs with low student/teacher ratios. After adjusting for inflation, program expenditures per student have declined during the past three years. Nevertheless, there is room for improvement. Technical colleges still have not reached the 17:1 systemwide student/teacher ratio goal we recommended in 1983. Accounting and secretarial programs in technical colleges continue to have smaller class sizes than similar disciplines in community colleges. Twenty-one percent of technical college programs had less than 14 students per instructor for two consecutive years. Nine percent of the programs were 25 percent or more below the statewide average of comparable programs.

We estimated how much the technical colleges could save if they increased their student/teacher ratio for non-health programs by cutting faculty positions. We assumed that student enrollment and average faculty salary remained the same. We found that:

- **Approximately $4.0 million could be saved annually by increasing the systemwide average student/teacher ratio for non-health programs to 17:1.**[22]

Stricter staffing ratios could result in significant savings.

We calculated possible savings under alternatives to the 17:1 systemwide standard. For example, $7.7 million could be saved if technical college non-health programs had 18 students per teacher. Alternatively, if all individual non-health programs achieved at least a 14:1 ratio, the state would save $2.7 million annually. These estimates represent the annual savings several years after the cuts are made. Initially, savings would be less than this because colleges would tend to cut instructors with below average salaries. Furthermore, there would be some expenses caused by layoffs. In the program duplication section, we examine how much could be saved by cutting duplicate programs with low student/teacher ratios.

Community colleges operate programs with higher student/teacher ratios than technical colleges, which partly reflects their lower level of state funding per student. Nevertheless, we found that a significant number of community college occupational disciplines had low student/teacher ratios. If community college non-health occupational disciplines had a minimum two-year average student/teacher ratio of 14:1 for 1991-92, we estimated that about $290,000 would have been saved per year. In addition, many non-occupational disciplines had student/teacher ratios that were significantly below the state average. We think that these disciplines should be reviewed to improve the system's overall efficiency.

22 This estimate excludes management programs, programs on Indian reservations, programs in prisons, and health programs. It includes savings in salary and fringe benefit expenses only. A systemwide ratio is not a minimum ratio for individual programs. It is the average ratio of all programs.

We recommend that:

- **The technical and community college governing boards should adopt standards for evaluating the efficiency of their programs and disciplines, and the system offices should periodically compare efficiency in similar fields among institutions.**

We think that the systems should continue to create financial incentives for efficiency through funding formulas. In addition, the systems should continue to support program review activities at the college level. But we think that the system offices also need to develop standards for reviewing programs to ensure that colleges become more efficient. The standards should differ by program type, with higher minimums for fields that can utilize more lecture classes. Each system should consider adopting stricter standards for larger colleges since larger student enrollment makes it easier to achieve higher ratios. System offices should periodically ask institutions to justify programs failing to meet these standards, and then could eliminate, restructure, or further examine these programs.

PLACEMENT RATES FOR OCCUPATIONAL PROGRAMS

For occupational programs, placement rates are important measures of program effectiveness.

An important mission of higher education, particularly vocational and technical education, is to train students for future employment. Community college occupational programs have the dual mission of preparing students for employment and transfer to baccalaureate institutions. The success of occupational programs depends largely on how many graduates find jobs related to their training or transfer to a parallel four-year program. In this section, we discuss placement standards, review how placement rates are measured, and examine the placement rates of technical and community college programs.

Placement Rate Standards

In the past, the Legislature mandated placement standards for technical college programs but not for occupational programs in other higher education systems. The 1983 Legislature required the State Board of Technical Colleges to eliminate a program if, "in the absence of compelling reasons to do otherwise," fewer than 51 percent of its graduates were employed in jobs closely related to their training.[23] The 1985 Legislature repealed this standard and instead directed the state board to adopt its own standard. The 1990 Legislature repealed the requirement to have a placement standard, but the state board still uses such a standard.

Until recently, the state board reviewed programs that placed less than 51 percent of graduates in related jobs in each of three consecutive years. In

23 *Minn. Laws* (1983), Ch. 314, Art. 5, Sec. 4, Subd. 1 and 2.

February 1993, the board raised the standard to 60 percent in each of two consecutive years. At the college level, some administrators told us that they use stricter standards for internal program review. For example, one college that we visited currently uses a 75 percent placement rate standard in its formal review process.

In our view, placement standards should be based on an *average* placement rate over a *multi-year* period, for two reasons. First, placement rates reflect general economic trends as well as program effectiveness. Looking at placement rates over a multi-year period can lessen the impact of economic upswings and downswings. Second, placement rates often vary from year to year because many of the programs at two-year colleges have relatively few graduates. Examining placement results over a multi-year period improves the statistical stability of placement rates.

We concluded that the technical college system's policy of reviewing programs that failed to meet the state standard in each of three years was too lenient because programs that had very low placement rates over a three-year period could pass the standard. For example, consider a program that placed 3 out of 11 graduates during the first year, 4 out of 7 graduates during the next year, and 3 out of 12 graduates during the third year. The three-year average placement rate would be 33 percent (10 out of 30). However, the program would pass the technical college placement standard because its placement rate exceeded 51 percent during the second year.

Placement Rate Measures

Under both the technical and community college followup systems, each college collects and reports placement data, using questions designed by the system office. The technical college system collects placement data from graduates of almost all of its programs.[24] In 1992, technical colleges surveyed 11,017 graduates from the class of 1991. The community college system collects job placement data from graduates of its occupational programs. Community colleges surveyed 2,641 graduates of its 1990-91 occupational programs.

Each system uses a different method to measure placement, complicating placement rate comparisons. One difference involves how to determine whether a job is related to the graduate's program. Under the technical college method, state board staff determine whether the job is related to the graduate's program based on descriptive information about the graduate's job. Under the community college method, interviewers ask graduates directly whether their jobs are related to their programs.

Another difference is that the technical college system achieves a much higher response rate from its graduates. It requires each college to determine the employment status of at least 95 percent of its graduates. As a result, the

24 It does not collect placement data for hour-based offerings (extension programs) and management programs designed for farmers and managers already employed.

technical colleges collected placement data on 97 percent of graduates surveyed in recent years, compared with 80 percent for the community college graduates. Thus, non-response bias is more likely to be a problem for the community college placement rates.

When calculating placement rates, both systems exclude graduates who were "unavailable" for employment. That is, a placement rate refers to the percentage of graduates available for placement who obtained jobs related to their program. Graduates are classified as unavailable for several reasons, as shown in Table 2.13. Overall, both the technical and community college systems classified about 14 percent of graduates who responded to the survey as unavailable for related employment. The most common reason was continuing education, which accounted for 12 percent of community college respondents and 6.5 percent of technical college repondents. Significant numbers of technical college graduates were also declared unavailable for employment because they took unrelated jobs by choice (3.8 percent) or refused to relocate to accept related employment (1.2 percent). The community college followup system uses the same definition of "unavailable" used by the technical colleges, but it does not report specific reasons other than continuing education.

The 1991 Legislature directed the Higher Education Coordinating Board to develop a statewide follow-up reporting system for post-secondary graduates of occupational programs. HECB plans to implement the first phase, which includes sub-baccalaureate occupational programs, for graduates from the class

Table 2.13: Reasons That Graduates of Occupational Programs Were Classified as Unavailable for Related Placement, Fiscal Years 1989-91

	Technical Colleges		Community Colleges	
	Number	Percent	Number	Percent
Number of Graduates Who Responded to Followup Surveys	33,570	100.0%	5,806	100.0%
Total Determined to be "Unavailable"	4,903	14.5	817	14.1
Reasons For Being "Unavailable"				
Continuing Education	2,179	6.5	688	11.8
Other Reasons (subtotal)	2,724	8.1	129	2.2
Unrelated work by choice	1,279	3.8	NA	NA
Medical condition, death, incarcerated	420	1.2	NA	NA
Unwilling to relocate for related employment	397	1.2	NA	NA
Unwilling to accept employment	304	0.9	NA	NA
Certification pending	174	0.5	NA	NA
Personal enrichment	102	0.3	NA	NA
Military	48	0.1	NA	NA

Note: NA indicates that data are not available.

Source: Program Evaluation Division analysis of technical and community college placement data.

of 1993. This data will be reported to HECB in Fall 1994, and state law requires HECB to prepare an annual placement report for consumers.[25]

HECB is implementing an improved method of measuring placement rates.

The new reporting system will make several changes that, in our view, will improve how placement rates are determined. First, it will establish a uniform system for all occupational programs, allowing students and policy makers to make valid comparisons among programs in different systems. Second, placement rates will be determined by directly asking graduates how related their jobs are to their programs. Third, to be counted as a successful placement, graduates must hold a full-time job (30 or more hours per week) for at least four weeks. Currently, the technical college system counts part-time jobs the same as full-time jobs in its placement rate calculations, while the community college system counts jobs of at least 20 hours a week. Finally, the new followup system eliminates some of the reasons that graduates are classified as unavailable. Under the new reporting system, graduates are classified as unavailable only if they are not in the labor force. As a result, graduates who are unwilling to relocate to accept related placement or who accept unrelated jobs by choice will no longer be classified as unavailable. Furthermore, graduates who are continuing their education but do not view their education as important will no longer be considered unavailable.

The new HECB method improves the chances that the placement rate will detect placement problems. For example, if many graduates can only find part-time jobs that are related to their program, there may be insufficient employer demand for the program's graduates. If a program has a low placement rate because graduates are not willing to relocate to take jobs, the program might be more successful if it were closer to available jobs.

Technical College Placement Rates

In this section, we use existing data to report placement rates using the current technical college method and, to the extent possible, the new method that HECB will use. We were able to incorporate the new method's definition of unavailable except for those who continued their education.[26] Since it was not possible to determine how many of the graduates who continued their education were actually unavailable for employment, we made high and low estimates. The high estimate assumes that all of the graduates who continued their education were unavailable. The low estimate assumes that all of these graduates were available, as in the case of graduates who continued their schooling because they could not find work..

We were not able to incorporate some other elements of HECB's new placement rate measure. For example, the placement rates we calculated included

25 *Minn. Laws* (1991), Ch. 356, Art. 1, Sec. 2.

26 Under the HECB method, we counted the following categories as available: (1) employed in unrelated work by choice, (2) unwilling to relocate (3) certification pending, and (4) military. We found that treatment of the latter two categories did not affect the number of low placement programs.

part-time jobs as successful placements and were based on system office decisions about whether a job was related to the graduate's program.

Between 74 and 79 percent of technical college graduates found work in related fields.

Table 2.14 summarizes three-year average placement rates for broad occupational categories. The overall placement rate was 83 percent under the technical college method and between 73.5 and 78.5 under the new method. Health programs had the highest placement rate (88.9 percent under the high estimate of HECB's new method). Business and office (71.5 percent) and marketing (72.5 percent) programs had the lowest rates.

Table 2.14: Technical College Placement Rates by Broad Instructional Area, Fiscal Years 1989-91

		Placement Rates		
		Using Proposed HECB Method		
Instructional Area	Number of Graduates FY 1989-91	High Estimate	Low Estimate	Using Technical College Method
Agriculture	657	85.0%	79.2%	88.1%
Marketing	2,451	72.5	67.4	78.2
Health	5,885	88.9	82.6	91.9
Home Economics	2,700	84.3	78.8	89.4
Business and Office	7,425	71.5	65.3	76.9
Technical	4,163	76.3	72.7	80.3
Trade and Industrial	11,612	77.9	74.1	82.5
Total	34,893	78.5%	73.5%	83.1%

Source: Program Evaluation Division analysis of technical college placement data.

Table 2.15 presents statewide placement rates for programs with more than 225 graduates during fiscal years 1989-91. By all three measures, placement rates exceeded 85 percent for three program categories -- nursing, dental assistant, and cosmetology. Programs with the lowest placement rates were travel planner, aviation mechanics, accounting, commercial art, and electronics technology.

We found that placement rates varied widely among individual programs. As Table 2.16 shows:

HECB's measure of placement rates identifies more programs with low placement.

- **Based on HECB's new placement measure, between 30 and 63 programs (5 to 11 percent of technical college programs) had three-year average placement rates under 51 percent. Between 18 and 26 percent of programs had placement rates over 90 percent.**

The number of low placement programs varies significantly with the method used to measure placement. From two to four times as many programs have placement rates less than 51 percent under the new method compared with the current technical college method. Furthermore, the actual difference between

Table 2.15: Technical College Placement Rates for Selected Programs, Fiscal Years 1989-91

Program Category	Number of Programs (FY 92)	Total Number of Graduates FY 1989-91	Placement Rates: Using Proposed HECB Method — High Estimate	Placement Rates: Using Proposed HECB Method — Low Estimate	Placement Rates: Using Technical College Method
Administrative Support Careers	28	4,563	75.6%	69.4%	80.9%
Practical Nursing	22	2,582	92.5	86.8	94.8
Accounting Careers	25	1,926	63.2	56.7	69.4
Machine Tool Careers	19	1,172	83.7	79.4	86.2
Electronics Technology	16	991	67.7	63.8	71.4
Auto Mechanics	25	962	75.6	68.2	82.0
Wholesale/Retail Marketing Careers	20	866	75.3	69.2	81.0
Graphic Arts	11	740	81.1	76.4	85.3
Cosmetology	9	738	88.6	86.7	96.7
Carpentry	16	706	85.5	83.2	90.7
Culinary Arts Careers	15	701	83.2	77.5	87.0
Construction Electrician	10	697	82.7	80.9	85.6
Aviation Mechanics	3	604	60.7	57.5	68.1
Welding	19	599	79.9	76.0	86.3
Auto Body Repair	16	583	78.3	75.9	84.3
Truck Driving	7	572	78.5	78.1	79.6
Computer Careers	16	537	70.3	65.4	72.7
Law Enforcement - AAS	2	530	70.2	66.3	72.8
Mechanical Drafting	16	483	85.6	82.8	88.9
Diesel Mechanics	13	479	81.4	80.5	85.3
Dental Assistant	10	477	90.9	86.4	95.9
Commercial Art	7	420	65.8	63.2	69.6
Human Services Technician	5	401	86.2	79.7	89.3
Nurse Assistant	21	392	85.2	75.6	89.7
Architectural Drafting	10	379	75.1	72.8	79.1
Heating, AC and Refrigeration	7	344	84.5	76.6	89.1
Building Utilities Technician	5	291	67.4	65.8	69.9
Surgical Technician	5	287	76.7	72.0	81.9
Health Unit Coordinator	4	285	79.6	77.0	84.5
Meat Cutting	2	278	89.1	73.0	93.0
Travel Planner	3	267	60.3	56.9	63.2
Marketing Management	5	244	80.8	74.4	81.7
Marine and Small Engine Mechanic	7	244	79.8	67.2	85.1
Electrical Lineworker	3	232	80.1	79.0	85.5
Parts Sales and Service	5	229	67.9	62.0	75.6

Note: Includes program categories with more than 225 graduates during fiscal years 1989 through 1991.

Source: Program Evaluation Division analysis of technical college placement data.

Table 2.16: Placement Rates for Technical College Programs, Fiscal Years 1989-91

	Number of Programs			Percent of Programs		
	Using Proposed HECB Method			Using Proposed HECB Method		
Placement Rate (Percent)	High Estimate	Low Estimate	Using Technical College Method	High Estimate	Low Estimate	Using Technical College Method
Less than 51	30	63	14	5.1%	10.6%	2.4%
51-59.9	36	50	25	6.1	8.4	4.2
60-74.9	130	150	98	21.8	25.1	16.4
75-89.9	243	226	209	40.7	37.9	35.0
90-100	155	105	248	26.0	17.6	41.5
Total	594	594	594	100.0%	100.0%	100.0%

Note: Table includes only programs that had at least 10 graduates during the three-year period and have not been closed. The data listed under "High Estimate" are based on the high estimate of placement rates using HECB's proposed method.

Source: Program Evaluation Division analysis of technical college placement data.

these methods could be greater than this because including only full-time jobs as successful placements would lower the placement rate.

While 51 percent has been the official standard in the past, we think that standards of 60 percent or higher would be more reasonable. We found that between 66 and 113 programs (11 to 19 percent) had placement rates under 60 percent. Programs with placement rates less than 60 percent are listed in Table 2.17 (based on the high estimate of the new HECB method). Twenty-six of these 69 programs are in the Twin Cities metropolitan area. Northern Minnesota was the region with the highest percentage of programs with low placement rates.

Community College Placement Rates

We report community college placement rates based on three methods. The first method is the community college method, which assumes that all graduates who continued their education were not available for employment and, therefore, are not counted in placement statistics. It can be considered a high estimate of the placement rate under HECB's new reporting system. The second method (Method B) is a middle estimate since it assumes that half of the graduates who continued their education were available for employment, as in the case of graduates who continued their schooling because they could not find work. The third method (Method C) is a low estimate since it assumes that all graduates who continued their education were available for employment.[27] Since community college occupational programs have the dual

27 Since the community college data does not report the reasons that graduates are unavailable except for continuing education, we were unable to make the same adjustments that we made for the technical college placement rates. However, because community colleges classified only 2.2 percent of its graduates as unavailable for reasons other than continuing education, we believe that the effect is negligible.

Table 2.17: Technical College Programs With Low Placement Rates, Fiscal Years 1989-91

College	Program	Number of Graduates FY 1989-91	3-Year Average Placement Rates: Using HECB Method, High Estimate	3-Year Average Placement Rates: Using HECB Method, Low Estimate	3-Year Average Placement Rates: Using Technical College Method
Minneapolis	Practical Business Management	19	30.0%	16.7%	42.9%
Thief River Falls	Accounting Careers	60	33.3	25.0	48.1
Minneapolis	Welding	17	35.7	33.3	35.7
Dakota County	Visual Merchandising	38	39.3	34.4	47.8
Eveleth	Accounting Careers	49	40.7	23.4	55.0
Hibbing	Construction Maintenance/Metal Trades	31	40.7	37.9	52.4
Wadena	Personnel Assistant	33	41.4	36.4	50.0
Duluth	Computer Careers	66	41.5	36.2	43.6
Moorhead	Electrical Design Drafting	32	41.9	40.6	41.9
Minneapolis	Accounting Careers	67	42.3	36.7	46.8
Northeast Metro	Major Appliance Repair	10	42.9	37.5	75.0
St. Paul	Major Appliance Repair	78	42.9	39.5	45.5
Anoka	Air Traffic Control -AAS	72	43.4	35.4	47.9
Eveleth	Welding	45	43.8	33.3	50.0
Hutchinson	Audio Technology	20	44.4	42.1	61.5
Minneapolis	Machine Tool Careers	42	44.4	39.0	44.4
St. Paul	Electronics Technology	95	44.9	42.6	51.9
Albert Lea	Travel Planner	32	45.2	43.8	51.9
East Grand Forks	Financial Services Careers	48	45.7	45.7	47.7
Brainerd	Sporting Goods Sales	31	45.8	36.7	68.8
Southwestern	Multi-Housing Management	27	47.6	47.6	55.6
Pine City	Accounting Careers	54	47.7	45.7	55.3
Detroit Lakes	Accounting Careers	76	48.1	41.5	60.0
Faribault	Accounting Careers	73	48.4	45.5	56.4
Moorhead	Accounting Careers	77	49.3	46.1	51.5
Albert Lea	Industrial Machine Technology	17	50.0	47.1	57.1
Detroit Lakes	Building Utilities Technician	34	50.0	46.7	53.8
Hibbing	Microcomputer Repair Sales & Service Tech.	22	50.0	38.1	61.5
St. Paul	Automated Manufacturing Technician - AAS	16	50.0	46.7	50.0
Wadena	Accounting Careers	96	50.8	40.3	77.3
St. Cloud	Materials Management	40	51.4	48.6	64.3
Minneapolis	Computer Careers	64	51.9	49.1	56.0
Willmar	Technical Art and Illustration	32	51.9	46.7	58.3
Rochester	Accounting Careers	51	52.4	46.8	55.0
Minneapolis	Aviation Mechanics	240	52.5	51.7	52.5
Brainerd	Financial Services Careers	45	52.8	45.2	54.3
Southwestern	Accounting Careers	182	52.9	48.5	59.2
East Grand Forks	Agricultural Equipment Mechanics	36	53.1	53.1	53.1
Southwestern	Financial Services Careers	15	53.3	53.3	88.9
Albert Lea	Accounting Careers	48	53.3	52.2	55.8
Hennepin	Landscaping	14	53.8	50.0	77.8
East Grand Forks	Pharmacy Technician	16	53.8	50.0	58.3
Red Wing	Electronic Musical Technician	36	54.5	50.0	58.1

Table 2.17: Technical College Programs With Low Placement Rates, Fiscal Years 1989-91, continued

College	Program	Number of Graduates FY 1989-91	3-Year Average Placement Rates Using HECB Method: High Estimate	3-Year Average Placement Rates Using HECB Method: Low Estimate	3-Year Average Placement Rates Using Technical College Method
Bemidji	Wholesale/Retail Marketing Careers	16	55.6%	35.7%	71.4%
East Grand Forks	Parts Sales and Service	45	55.6	48.8	60.6
Minneapolis	Wholesale/Retail Marketing Careers	26	56.3	47.6	62.5
Eveleth	Instrumentation Technology	35	56.3	54.5	58.1
Brainerd	Accounting Careers	65	56.4	50.0	61.5
East Grand Forks	Medical Assistant	30	56.5	52.0	65.0
Duluth	Accounting Careers	65	56.9	51.8	65.2
Southwestern	Administrative Support Careers	286	57.0	53.0	64.7
Albert Lea	Computer Careers	11	57.1	36.4	66.7
East Grand Forks	Accounting Careers	49	57.1	55.6	62.5
Anoka	Auto Body Repair	84	57.1	55.6	62.5
Northeast Metro	Machine Tool Careers	18	57.1	44.4	57.1
Anoka	Architectural Drafting	45	57.5	56.1	60.5
St. Paul	Computer Careers	64	57.7	52.6	57.7
Hennepin	Audiovisual Media Production	25	57.9	45.8	64.7
Duluth	Electronics Technology	45	58.1	55.6	59.5
Hibbing	Auto Mechanics	43	58.3	34.1	60.9
Thief River Falls	Administrative Support Careers	70	58.7	56.7	80.9
Rochester	Financial Services Careers	21	58.8	52.6	66.7
Hennepin	Bio-Medical Equipment Technician	21	58.8	50.0	58.8
Dakota County	Photographic Technology	37	58.8	57.1	66.7
Northeast Metro	Building Utilities Technician	29	59.1	58.3	66.7
Minneapolis	Commercial Art	136	59.8	57.0	62.9

Note: This table includes programs with 10 or more graduates that had a three-year average placement rate less than 60 percent, based on the high estimate of placement rates using HECB's method. It excludes nine low-placement programs that have since been discontinued.

Source: Program Evaluation Division analysis of technical college placement data.

Between 78 and 83 percent of community college occupational graduates found work related to their programs.

mission of preparing students for employment and transfer to baccalaureate institutions, it is reasonable to expect that many of these students are pursuing baccalaureate degrees. Community college staff found that 55 percent of graduates of North Hennepin Community College who were classified as continuing their education were enrolled full-time in baccalaureate programs related to their community college degree. While these results are not conclusive, they suggest that the middle estimate is reasonable.

Overall, community college occupational programs placed 78 to 83 percent of available graduates in related jobs. Nursing programs had the highest placement rates (98 percent, based on the community college method). Programs with below-average rates included law enforcement (61.2 percent), human services technician (63.8 percent), and business programs (65 percent).

As with technical college programs, the number of individual programs with low placement rates depends on how the measure classifies graduates who continued their education. As Table 2.18 shows,

- **Between 7 and 21 percent of community college occupational programs had placement rates averaging less than 51 percent over three years. Our middle estimate is that 11 percent had placement rates under 51 percent.**

Table 2.18: Placement Rates for Community College Occupational Programs, Fiscal Years 1989-91

Three-Year Average Placement Rate (Percent)	Number of Programs Using Community College Method	Using Method B[a]	Using Method C[a]
Less than 51	7	11	21
51-59.9	6	17	22
60-74.9	28	25	15
75-89.9	21	20	20
90-100	37	26	21
Total	99	99	99

Note: Includes only programs with 10 or more respondents.

Source: Program Evaluation Division analysis of community college placement data.

[a]The community college method excludes all graduates who continued their education. Method B excludes half of graduates who continued their education. Method C includes all graduates who continued their education.

A significant number of community college programs had placement rates below 60 percent.

We also examined placement rates using a 60 percent standard. Based on the community college method of calculating placement, 13 percent of community college occupational programs had placement rates under 60 percent. Based on our middle estimate, 28 percent had placement rates under 60 percent. These figures exclude four programs with placement rates under 60 percent that have been discontinued.

Table 2.19 shows programs with placement rates under 60 percent based on the community college method. Five of these programs with low placement were law enforcement programs. One reason that law enforcement programs have low placement rates might be that their graduates must complete a skills training program and pass a state exam before they can become law enforcement officers. Currently, the skills training program in the Twin Cities area has a waiting list, delaying employment opportunities for some law enforcement graduates. It is not clear to what extent these requirements affected the placement rates of graduates during fiscal years 1989 through 1991.[28]

28 Graduates who are classified as unavailable because they are continuing their education or their certification is pending are excluded from placement rate calculations under the community college method.

Table 2.19: Community College Occupational Programs With Low Placement Rates, Fiscal Years 1989-91

College	Program	Number of Graduates FY 1989-91	Number Who Responded to Survey	3-Year Average Placement Rates: Using Community College Method[a]	3-Year Average Placement Rates: Using Method C[a]
Rochester	Business, Marketing, Management	59	31	33.3%	20.0%
Fond du Lac	Law Enforcement[b]	12	12	33.3	25.0
Mesabi	Law Enforcement	20	19	37.5	16.7
North Hennepin	Graphic Design	46	43	45.5	37.5
Austin	Human Care Specialist	23	23	45.5	23.8
Rochester	Law Enforcement	64	31	46.2	38.7
Inver Hills	Human Services	55	53	50.0	34.6
Minneapolis	Filmmaking	18	16	53.8	46.7
Northland	Legal Assistant/Para-Legal	26	23	55.6	43.5
Anoka Ramsey	Business, Marketing, Management	79	56	56.5	47.3
North Hennepin	Law Enforcement[c]	204	184	57.1	52.7
North Hennepin	Legal Assistant	129	122	59.6	55.1
Inver Hills	Law Enforcement[c]	142	74	59.7	54.8

Note: Excludes three programs with placement rates under 60 percent that have been discontinued.

Source: Program Evaluation Division analysis of community college placement data.

[a]Method C is a low estimate of the placement rate using HECB's measure. It assumes that all graduates who continue their education are available for employment. The community college method is a high estimate of HECB's measure. It assumes that all graduates who continue their education are unavailable for employment.

[b]This program will stop accepting new students in Fall 1993.

[c]In Fall 1993 these two programs will be consolidated with the other three law enforcement programs in the Twin Cities area.

In Fall 1993, the community college system will consolidate the five law enforcement programs in the Twin Cities area, including two of the programs with placement rates less than 60 percent. All instruction in the law enforcement discipline, including skills training, will occur at one central site. The community colleges have established admission standards and plan to reduce enrollment in law enforcement programs.

Implications

Both the technical and community colleges report overall placement rates of over 80 percent. However, placement rates vary significantly among programs. There are a substantial number of occupational programs with low placement rates, particularly when measured by our estimates of HECB's new method. In 1992, the cost of these programs was between $4.5 and

$9.3 million.[29] We think that HECB's method will improve the ability of policy makers to identify programs with placement problems. The State Board of Technical Colleges adopted a stricter placement standard in February 1993. We recommend:

Two-year colleges should review more of their low-placement programs.

- **The technical college board should measure placement rates using the HECB method. The community college board should adopt similar measures, as well as placement standards.**

Programs that fail to meet these standards should be reviewed for restructuring or elimination.

PROGRAM DUPLICATION AND ACCESS

As discussed in Chapter 1, program duplication is not a bad thing, in and of itself. However, program duplication can hurt program performance if (1) there are too many programs for student demand, preventing colleges from attracting enough students to operate efficiently, or (2) programs produce too many graduates for the number of available jobs. While student/teacher ratios and placement rates help identify these problems, it is also useful to examine duplication. The student/teacher ratio that state policy makers consider acceptable may depend in part on student access. State policy makers may tolerate a low student/teacher ratio if there is no other program in the area. If, however, there is a similar program nearby, access cannot be used to justify low student/teacher ratios. In this section we begin by examining the extent of duplication. To determine whether duplication is unnecessary, we review the student/teacher ratios and placement rates of duplicated programs.

In this section, we review duplication among technical and community college occupational programs. We did not review duplication among liberal arts and science disciplines because most colleges offer each discipline in order to provide comprehensive instruction in liberal arts and sciences.

Extent of Program Duplication

We measured the extent of program duplication based on program inventories developed during 1992 by the technical colleges, community colleges, state universities, and the University of Minnesota. For sub-baccalaureate programs, we focused on occupational programs and excluded academic programs and extension courses. In our duplication analysis, we assumed that Associate in Science (AS) and Associate in Applied Science (AAS) degrees are distinct, although some people told us there is little difference between these degrees in some fields.

29 The cost of technical college programs with placement rates less than 51 percent was between $4.0 and $7.6 million. The corresponding cost for community colleges was between $0.5 and $1.7 million.

Occupational programs are offered by all 34 campuses of the technical colleges and 21 campuses of the community colleges. These campuses are shown in Figure 1.2. To measure duplication, we looked at the number of programs within 20, 35, and 60 miles of each other.[30] There is more potential duplication in the Twin Cities area, particularly based on the 20-mile standard. All 11 campuses in the Twin Cities area are within 20 miles of another campus. Outside the Twin Cities area, 19 of the 44 campuses are located within 20 miles of another two-year college campus. These include campuses in the eight communities with both a technical and a community college (Austin, Rochester, Willmar, Brainerd, Duluth, Hibbing, Eveleth/Virginia, and Thief River Falls), Staples and Wadena (both technical colleges), and Fond du Lac Community College Center, which is within 20 miles of the Duluth institutions.

Overall, we found that 18 percent of Minnesota's 912 sub-baccalaureate occupational programs have a duplicate program within 20 miles, 27 percent have a duplicate within 35 miles, and 50 percent have a duplicate within 60 miles.[31] Table 2.20 breaks down duplication by system and geographic area. It shows that:

Program duplication is more common in the Twin Cities area.

Table 2.20: Occupational Program Duplication by Region for Technical and Community Colleges

	Twin Cities		Outstate		
	Technical Colleges	Community Colleges	Technical Colleges	Community Colleges	Total
Number of Programs	224	62	535	91	912
Number With Duplicate Programs Within:					
20 miles	121	39	5	3	168
35 miles	150	46	35	12	243
60 miles	156	47	228	27	458
Percent With Duplicate Programs Within:					
20 miles	54%	63%	1%	3%	18%
35 miles	67	74	7	13	27
60 miles	70	76	43	30	50

Note: Includes duplication between and within technical and community college systems. Does not include Associate in Arts degree programs. Associate in Science and Associate in Applied Science degrees in the same field were not considered duplicative, nor were Associate in Science and diploma programs. Distinctions in program length were disregarded, as were distinctions between Associate in Applied Science and diploma programs.

Source: Program Evaluation Division analysis of 1992 technical and community college program inventories.

30 In the late 1960s, HECB suggested that public institutions should exist within 35 miles of cities with populations exceeding 5,000.

31 If duplication between Associate in Science and Associate in Applied Science degree programs were included, there would be an additional 6 duplicate programs (less than 1 percent) at the 20-mile level, 11 additional duplicate programs (1 percent) at the 35-mile level, and 22 additional duplicate programs (2 percent) at the 60-mile level.

- **Program duplication is much more common in the Twin Cities area than in the rest of the state, particularly based on the 20 or 35 mile standard.**

In the Twin Cities area, 54 percent of technical college programs have duplicate programs within 20 miles, compared with only 1 percent of outstate programs. The corresponding duplication rates for community college programs are 63 percent in the Twin Cities area and 3 percent for outstate Minnesota.

Based on the 60-mile standard, 70 percent of the technical college programs in the Twin Cities area duplicate another program, compared with 43 percent of programs outside the Twin Cities area. Community colleges also had higher duplication rates in the Twin Cities area (76 percent compared with 30 percent outside the Twin Cities area).

We found that:

There is little program duplication at "co-located" colleges outside the Twin Cities area, but there may be unnecessary course duplication.

- **There are only two instances of program duplication in the eight outstate communities with co-located technical and community colleges.**

In Rochester and in Eveleth/Virginia, the technical and community colleges both offer secretarial programs. If we had included duplication between Associate in Science and Associate in Applied Science degrees, there would have been one other instance of duplication at co-located sites outside the Twin Cities area. Rochester's community and technical colleges both offer programs in electronics technology.

While there is little *program* duplication at co-located sites, some administrators expressed concerns to us about duplication among individual *courses*. For example, most community colleges offer accounting courses to meet the needs of students in various degree programs, even if they do not offer accounting degrees or diplomas. Also, technical colleges have been adding requirements for applied "general studies" courses, some of which are similar to those offered at community colleges.

Tables 2.21 and 2.22 list technical and community college program categories with the most duplication.[32] Table 2.21 shows that the technical college program categories with the most duplication at the 20-mile level are secretarial programs, followed by accounting, auto mechanics, computer careers, and machine tool careers. Out of 28 secretarial programs, 8 are within 20 miles of another secretarial program, 13 are within 35 miles, and 26 are within 60 miles of another secretarial program. Four categories (accounting, auto mechanics, computer careers, and machine tool careers) each has six duplicate programs based on the 20-mile standard. An additional 17 categories have three or more duplicate programs.

32 Included are program categories with three or more programs that duplicate another program within 20 miles.

Table 2.21: Technical College Duplicate Programs

Program Category	Number of Programs	Number of Programs that Duplicate Another Program Within 20 Miles	35 Miles	60 Miles
Secretarial	28	8	13	26
Accounting Careers	25	6	8	23
Auto Mechanics	25	6	8	22
Computer Careers	16	6	8	12
Machine Tool Careers	19	6	6	17
Small Business Management	25	5	9	21
Practical Nursing	22	5	6	19
Welding	19	5	6	15
Auto Body Repair	16	5	5	10
Culinary Arts Careers	15	5	5	9
Architectural Drafting	10	5	5	7
Graphic Arts	11	5	5	5
Mechanical Drafting	16	4	4	14
Wholesale/Retail Marketing Careers	19	3	7	12
Diesel Mechanics	13	3	4	7
Electronics Technology	15	3	3	9
Commercial Art	7	3	3	7
Construction Electrician	10	3	3	4
Child Development Assistant	5	3	3	3
Apparel Services	3	3	3	3
Cosmetology	9	3	3	3
Cabinetmaking	3	3	3	3
Farm Business Management	19	1	5	16
Carpentry	16	1	2	10
Heating, AC and Refrigeration	7	1	2	6

Note: Includes technical college programs that duplicate community or technical college programs. Associate in Science and Associate in Applied Science degrees in the same field were not considered duplicative, nor were Associate in Science and diploma programs. Distinctions in program length were disregarded, as were distinctions between Associate in Applied Science and diploma programs.

Source: Program Evaluation Division analysis of 1992 technical and community college program inventories.

Table 2.22: Community College Duplicate Programs in Occupational Fields

Program Category	Number of Programs	Number of Programs that Duplicate Another Program Within 20 Miles	35 Miles	60 Miles
Secretarial	13	6	10	12
Nursing (RN Training)	16	6	7	9
Accounting	10	6	7	9
Law Enforcement[a]	13	5	6	10
Human Services	11	5	5	6
Business Marketing and Management	8	4	5	5
Marketing Management	6	3	3	3
Chemical Dependency Specialist	2	2	2	2
Computer Careers	3	2	2	2

Note: Includes community college programs that duplicate community or technical college programs. Associate in Science and Associate in Applied Science degrees in the same field were not considered duplicative, nor were Associate in Science and diploma programs. Distinctions in program length were disregarded, as were distinctions between Associate in Applied Science and diploma programs.

Source: Program Evaluation Division analysis of 1992 technical and community college program inventories.

[a]The five law enforcement programs in the Twin Cities area are being restructured. All law enforcement instruction in the Twin Cities will occur at one site.

Community college program categories with the most duplication are secretarial, nursing, accounting, law enforcement, and human services. As indicated earlier, the five law enforcement programs in the Twin Cities area will be consolidated in Fall 1993.

Each of these program categories has five or six duplicate programs, based on the 20-mile standard. Two additional categories have three or more duplicate programs.

Inter-System Duplication

Table 2.23 breaks down duplication within and between systems. We found:

- **Most program duplication occurs within the community and technical college systems rather than between systems.**

Table 2.23: Occupational Program Duplication Within and Between Technical and Community College Systems

	Technical Colleges		Community Colleges		Total	
	Number of Programs	Percent	Number of Programs	Percent	Number of Programs	Percent
Number of Programs	759	100%	153	100%	912	100%
Intra-System Duplication Within:						
20 Miles	122	16	34	22	156	17
35 Miles	176	23	50	33	226	25
60 Miles	374	49	58	38	432	47
Inter-System Duplication Within:						
20 Miles	29	4	17	11	46	5
35 Miles	41	5	24	16	65	7
60 Miles	68	9	35	23	103	11

Note: If two programs duplicated each other, both programs were counted as duplicate programs. Associate in Science and Associate in Applied Science degrees in the same field were not considered duplicative, nor were Associate in Science and diploma programs. Distinctions in program length were disregarded, as were distinctions between Associate in Applied Science and diploma programs.

Source: Program Evaluation Division analysis of 1992 technical and community college program inventories.

We found no program duplication between sub-baccalaureate occupational programs at the state universities and sub-baccalaureate programs from the other systems. More than three times as many programs have a duplicate program within the same system as between systems. Based on the 20-mile standard, 156 programs duplicate a program within the same system, whereas 46 programs duplicate a program from the other system. The corresponding numbers for the 60-mile standard are 432 programs within systems and 103 between systems.

Table 2.24 lists program categories in which we found inter-system duplication. We found that:

- **Most of the inter-system duplication occurs in two fields -- secretarial and accounting.**

Table 2.24: Program Duplication Between Technical and Community Colleges

	Number of Programs			Number of Programs Duplicating Programs in Other System		
Program	Total	Technical Colleges	Community Colleges	Total	Technical Colleges	Community Colleges
Secretarial	41	28	13	14	8	6
Accounting	33	25	10	12	6	6
Computer	19	16	3	7	5	2
Small Business Management	27	25	2	4	3	1
Wholesale/Retail	20	19	1	3	2	1
Commercial Art	8	7	1	3	2	1

Note: Duplicate programs were defined as those within 20 miles of a comparable program.

Source: Program Evaluation Division analysis of 1992 technical and community college program inventories.

Eight technical colleges and six community colleges have secretarial programs within 20 miles of another secretarial program in the other system. Similarly, six technical colleges and six community colleges offer accounting programs within 20 miles of an accounting program in the other system. Other areas with some inter-system duplication are computers, small business management, retailing, commercial art, and medical records technician.

All but two instances of inter-system duplication are in the Twin Cities area. The exceptions are secretarial programs in two co-located sites (Rochester and Virginia/Eveleth).

We found that:

- **Some of the inter-system duplication results from overlapping statutory missions in occupational instruction.**

State law permits some overlap in community and technical college missions.

The mission statements adopted by the 1991 Legislature suggest roles for both systems in occupational fields. By state law, technical colleges can only offer "vocational training and education to prepare students for skilled occupations that do not require a baccalaureate degree...."[33] Community colleges can offer "occupational programs in which all credits earned will be accepted for transfer to a baccalaureate degree in the same field of study," in addition to academic and remedial instruction.[34] Although community college credits must be transferable to four-year institutions, graduates are not required to transfer;

33 Minn. Stat. §135A.052, Subd. 1.

34 Ibid.

many intend to seek employment after receiving their associate degrees. Likewise, although technical college programs are designed to prepare students for occupations that do not require a four-year degree, many technical colleges have been trying to improve the transferability of their credits to baccalaureate institutions. Although most technical college students seek employment after graduation, it is not unusual for them to seek baccalaureate degrees later in their careers.

The technical colleges' efforts to make their credits more transferable is one example of how the technical and community colleges have grown more alike in recent years. Another example is that most of the newest technical college programs require both technical and general studies, thus becoming more similar to community colleges' program requirements.[35]

We think that the Higher Education Board, created by the 1991 Legislature to govern the two-year public colleges and state university system, should seriously consider the potential for consolidating nearby community and technical college programs and courses in the same field--particularly those related to accounting and secretarial fields. The technical coursework in these programs may differ somewhat in its focus, method of instruction, and transferability of credits. However, at a time when the state's fiscal resources are limited, it is important for governing boards to scrutinize these differences and ask which are worth sustaining. If at least one of two nearby programs has student/teacher ratios below the standards set by the Higher Education Board, the board should consider program consolidation.

Technical colleges should provide students with information on the transferability of credits to baccalaureate institutions.

In addition, we think that the higher education systems should make greater efforts to inform prospective students about inter-system program differences--particularly those related to credit transfer. Because many technical college credits do not transfer to baccalaureate institutions, and because many technical college graduates decide to pursue baccalaureate degrees later in their careers, we recommend that:

- **The technical college system office should work with colleges to ensure that all students receive program-specific information concerning the transfer of technical college credits to baccalaureate institutions.**

Unnecessary Program Duplication

To determine whether program duplication is unnecessary, we examined the student/teacher ratios and placement rates of duplicate programs. We think that it is reasonable to use somewhat higher standards when reviewing duplicate programs because student access cannot be used to justify low student/teacher ratios. As a result, we used a student/teacher ratio standard of 15:1 and a placement standard of 60 percent. Tables 2.25 and 2.26 summarize

35 The technical college system office has encouraged its institutions to seek regional accreditation in the next two to three years, and accrediting agencies will likely expect colleges to offer a broad array of general education, either on their own or through arrangements with other institutions.

Table 2.25: Student/Teacher Ratios of Technical College Duplicate Programs, Fiscal Years 1991-92

Student/Teacher Ratio	Number of Programs that Duplicate Another Program Within:			Percent of Active Programs that Duplicate Another Program Within:		
	20 Miles	35 Miles	60 Miles	20 Miles	35 Miles	60 Miles
Less than 10	4	7	10	0.7%	1.3%	1.8%
10 - 12	5	9	28	0.9	1.7	5.2
12 - 15	18	25	73	3.3	4.6	13.4
15 - 17	22	33	61	4.0	6.1	11.2
17 - 20	36	42	78	6.6	7.7	14.3
20 - 25	18	23	32	3.3	4.2	5.9
Over 25	2	4	7	0.4	0.7	1.3
Duplicate Programs	105	143	289	19.3%	26.3%	53.2%
Active Programs	543	543	543	543	543	543

Note: Student/teacher ratios are two-year averages for fiscal years 1991 and 1992. This table includes only active programs that were operating in both 1991 and 1992. It excludes management programs and health programs.

Source: Program Evaluation Division analysis of technical and community college data.

Table 2.26: Placement Rates of Technical College Duplicate Programs, Fiscal Years 1989-91

Three-Year Average Placement Rate (Percent)	Number of Programs that Duplicate Another Program Within:		
	20 Miles	35 Miles	60 Miles
Less than 50	7	9	16
50-59.9	9	13	21
60 to 74.9	20	29	56
75 to 89.9	47	62	135
90 to 100	28	36	79
Total	111	149	307

Note: Placement rates are based on our high estimate of HECB's new measure. The table excludes programs with fewer than 10 graduates during the three year period 1989 through 1991.

Source: Program Evaluation Division analysis of technical college data.

the student/teacher ratios and placement rates of duplicate programs. We included only active programs that operated in both 1991 and 1992. We excluded management programs and health programs from our analysis of student/teacher ratios since they are often designed to operate at low ratios. We found that:

- **In fiscal years 1991-92, 41 technical college programs (8 percent of active programs) that duplicated other programs within 35 miles had student/teacher ratios less than 15:1.**

If we included programs that duplicated another program within 60 miles, there would have been 111 duplicate programs (20 percent of active programs) with less than 15 students per teacher.

We also found that:

- **22 technical college programs that duplicated other programs within 35 miles had three-year placement rates that were less than 60 percent.**[36]

Overall, there were 60 programs (9 percent) that duplicated another program within 35 miles and had low placement rates or low student/teacher ratios.[37]

Duplicate programs with low student/teacher ratios or low placement rates are listed in Tables 2.27 and 2.28. Most of these programs are in the Twin Cities area. For example, 17 out of the 22 duplicate programs with low placement rates were in the Twin Cities area.

For community colleges, two non-health programs that duplicated another program within 35 miles had less than 15 students per teacher. One of these programs is being discontinued. If we included duplicate programs based on the 60-mile standard, there were six programs with less than 15 students per teacher.

Seven duplicate community college programs (based on the 35-mile standard) had placement rates less than 60 percent. These programs include two of the five law enforcement programs in the Twin Cities area that are being consolidated. Based on the 60-mile standard, eight duplicate programs had placement rates less than 60 percent. Table 2.29 lists these programs.

Implications

It is especially important to review programs with low staffing or low placement rates that duplicate nearby programs.

It is important for the technical and community college boards to review programs with low student/teacher ratios or low placement rates, but this is especially important when duplicate programs are available nearby. We found several programs which have low student/teacher ratios or low placement and are within 20 miles of a comparable program. Within 35 or 60 miles, many additional programs have low student/teacher ratios or low placement rates.

To estimate the cost savings that could be obtained by eliminating unnecessary duplication, we assumed that the number of students remained the same and that each duplicate program with a low student/teacher ratio (based on a two-year average) attained a minimum student/teacher ratio of 15:1. We excluded health programs and management programs from this estimate.

36 Based on the new HECB method (high estimate) for treating unavailable graduates. We excluded programs with less than 10 graduates and programs that have been closed.

37 Six duplicate programs had both low placement rates and low student/teacher ratios. The percentage calculation included health programs in the base.

Table 2.27: Technical College Duplicate Programs With Low Student/Teacher Ratios

College	Program	Full-Year-Equivalent Enrollment FY 92	Student/Teacher Ratio		
			2-Year Average	FY 91	FY 92
Anoka	Mechanical Drafting	20.0	6.8	6.6	7.0
Staples	Radio Broadcasting Tech-AAS	8.8	7.8	6.9	8.8
Austin	Administrative Support Careers	36.8	8.3	12.6	6.1
Northeast Metro	Dietetic Technician - AAS	13.3	8.7	7.7	9.6
Minneapolis	Wholesale/Retail Marketing Careers	11.6	9.4	8.0	10.6
Dakota County	Automotive Tech (ASEP/ASSSET)-AAS	21.4	9.4	9.5	9.4
St. Paul	Auto Mechanics	33.0	9.8	13.0	7.8
Austin	Computer Careers	6.7	10.1	13.0	9.7
St. Paul	Culinary Arts Careers	47.0	10.6	10.8	10.4
Dakota County	Computer Careers	31.1	10.7	11.6	9.9
Faribault	Wholesale/Retail Marketing Careers	14.2	11.0	8.8	13.9
Dakota County	Wholesale/Retail Marketing Careers	32.0	11.4	10.6	12.8
Northeast Metro	Upholstery	20.9	11.4	13.4	9.5
Northeast Metro	Horticulture Technology Careers	7.3	11.6	16.3	7.7
Northeast Metro	Computer Careers	55.5	11.8	11.6	12.1
Northeast Metro	Auto Mechanics	44.0	11.9	12.2	11.7
Faribault	Welding	12.7	12.4	12.3	12.4
Dakota County	Machine Tool Careers	55.4	12.4	11.5	13.2
St. Paul	Chemical Technology	29.6	12.5	12.4	12.6
Northeast Metro	Enviromental-Chemical Technology	21.3	12.6	11.4	14.1
Hennepin	Painting and Decorating	16.0	12.7	11.2	15.5
Minneapolis	Apparel Services	15.6	12.7	11.3	15.6
St. Paul	Painting and Decorating	16.0	13.1	12.8	13.4
Faribault	Accounting Careers	28.4	13.1	14.9	11.4
St. Paul	Diesel Mechanics	35.1	13.4	14.1	12.8
Dakota County	Administrative Support Careers	107.5	13.6	13.4	13.8
Anoka	International Trade	7.9	13.8	16.7	9.7
Northeast Metro	Mechanical Drafting	19.8	13.8	12.9	14.8
St. Paul	Electronics Technology	64.2	13.8	11.5	16.3
Dakota County	Graphic Arts	50.5	13.9	14.4	13.5
Northeast Metro	Wholesale/Retail Marketing Careers	30.9	14.0	12.9	14.9
St. Paul	Machine Tool Careers	159.4	14.0	14.4	13.7
St. Paul	Carpentry	20.9	14.2	14.2	14.2
Albert Lea	Wholesale/Retail Marketing Careers	38.6	14.3	14.5	14.2
Northeast Metro	Cosmetology	87.4	14.4	13.6	15.1
Anoka	Auto Body Repair	38.9	14.4	15.7	13.3
Northeast Metro	Apparel Services	19.8	14.4	11.6	17.5
Anoka	Administrative Support Careers	127.9	14.5	14.9	14.1
St. Paul	Apparel Services	22.7	14.7	15.9	13.6
St. Paul	Major Appliance Repair	51.7	14.7	13.2	16.0
St. Paul	Architectural Drafting	35.3	14.8	17.4	12.6

Note: Duplicate programs defined as those within 35 miles of a comparable program. The table excludes management programs, health programs, closed programs, and programs that were not active in both 1991 and 1992.

Source: Program Evaluation Division analysis of technical and community college data.

Table 2.28: Technical College Duplicate Programs With Low Placement Rates

College	Program	Number of Graduates FY 89-91	Placement Rate HECB Method High	HECB Method Low	Technical College Method	Student/ Teacher Ratios FY 92
Minneapolis	Welding	17	35.7%	33.3%	35.7%	19.8
Dakota County	Visual Merchandising	38	39.3	34.4	47.8	14.0
Minneapolis	Accounting Careers	67	42.3	36.7	46.8	19.3
Northeast Metro	Major Appliance Repair	10	42.9	37.5	75.0	14.1
St. Paul	Major Appliance Repair	78	42.9	39.5	45.5	16.0
Minneapolis	Machine Tool Careers	42	44.4	39.0	44.4	17.1
St. Paul	Electronics Technology	95	44.9	42.6	51.9	16.3
Pine City	Accounting Careers	54	47.7	45.7	55.3	16.2
Faribault	Accounting Careers	73	48.4	45.5	56.4	11.4
Minneapolis	Computer Careers	64	51.9	49.1	56.0	29.8
Hennepin	Landscaping	14	53.8	50.0	77.8	22.2
Minneapolis	Wholesale/Retail Marketing Careers	26	56.3	47.6	62.5	10.6
Southwestern	Administrative Support Careers	286	57.0	53.0	64.7	12.2
Albert Lea	Computer Careers	11	57.1	36.4	66.7	20.3
Anoka	Auto Body Repair	84	57.1	55.6	62.5	13.3
Northeast Metro	Machine Tool Careers	18	57.1	44.4	57.1	14.5
Anoka	Architectural Drafting	45	57.5	56.1	60.5	17.2
St. Paul	Computer Careers	64	57.7	52.6	57.7	17.5
Hennepin	Audiovisual Media Production	25	57.9	45.8	64.7	13.6
Hibbing	Auto Mechanics	43	58.3	34.1	60.9	16.4
Northeast Metro	Building Utilities Technician	29	59.1	58.3	66.7	16.1
Minneapolis	Commercial Art	136	59.8	57.0	62.9	18.9

Source: Program Evaluation Division analysis of technical and community college data.

Table 2.29: Community College Duplicate Occupational Programs With Low Placement Rates

College	Program	Number of Graduates (FY 89-91)	Placement Rate Community College Method	Method B
North Hennepin	Graphic Design	46	45.5	37.5
Inver Hills	Human Services	55	50.0	34.6
North Hennepin	Law Enforcement*	204	57.1	52.7
Inver Hills	Law Enforcement*	142	59.7	54.8
Mesabi	Law Enforcement	20	37.5	16.7
Anoka-Ramsey	Business, Marketing, and Management	79	56.5	47.3
North Hennepin	Legal Assistant	129	59.6	55.1

Source: Program Evaluation Division analysis of community college data.

*These two programs have been consolidated with the other three law enforcement programs in the Twin Cities area.

We found that:

- **Requiring duplicate programs to have a minimum student/teacher ratios of 15:1 would save between $0.6 million and $1.8 million annually, depending on whether duplication is defined at the 20 or 60 mile level.**

Attaining a minimum of 15 students per teacher for programs that duplicate another program within 20 miles would save $0.6 million annually. If programs that duplicated another program within 35 miles were included, about $0.9 million would be saved. If programs that duplicated another program within 60 miles were included, about $1.8 million would be saved. As with our other cost savings estimates, it would take several years to achieve these annual savings. Initially, the savings would be less because, under teacher contracts, colleges would lay off instructors who have less seniority or are employed part-time. These instructors tend to have below-average salaries.

SUMMARY

Minnesota has 36 technical and community colleges that offer occupational courses and programs at 55 campuses. This large network of institutions provides Minnesotans with excellent access to higher education, but it also creates potential for instructional overlap. While some of this duplication is appropriate, we found instances in which duplicated programs are also inefficient or ineffective. We think these programs should be restructured or eliminated.

In general, we think the technical and community college systems need to have better procedures for identifying inefficient or ineffective programs, and we offer some suggestions in Chapter 4. Although it will be the responsibility of institutions to initiate most program changes, the system offices should continuously monitor key measures of performance and periodically ask colleges to justify low-performing programs. Having the system offices play a more active oversight role will encourage institutions to review programs more vigorously.

We think that it is possible to save or reallocate several million dollars annually through the restructuring of inefficient or ineffective programs. Additional savings might be possible from improved coordination of duplicate coursework offered by nearby institutions.

Baccalaureate Programs

CHAPTER 3

Minnesota has 10 public institutions that offer baccalaureate degrees: three campuses of the University of Minnesota and seven state universities. These institutions awarded more than 16,000 baccalaureate degrees in 1990-91 in about 230 fields of study.

We asked:

- **How many institutions offer degrees in various subject areas, and is there evidence of unnecessary duplication?**
- **How many departments in four-year institutions have relatively low numbers of faculty or undergraduate students, raising questions about their viability?**
- **To what extent do the costs of providing instruction in particular fields differ among institutions?**
- **What is known about the employment demand for baccalaureate graduates in various fields?**

We found that there is considerable duplication of programs among baccalaureate institutions, but much of this duplication is necessary to provide basic liberal arts and sciences coursework consistent with institutional missions. Within these and other academic disciplines, there are some programs that are extremely small or have high costs per student. We think these programs should be subject to regular review to determine whether they (1) are of sufficient quality, and (2) could be provided in more efficient ways--perhaps by offering fewer majors or concentrations, or with different staffing arrangements. Although this chapter identifies areas in which the systems should explore program changes, faculty contracts and tenure codes limit the ability of four-year institutions to reap immediate cost savings from program consolidation, restructuring, or elimination. Because of this, it is especially important for the systems and Higher Education Coordinating Board to scrutinize programs more closely at the time they are proposed and in their early years of operation.

We reviewed data from all of Minnesota's public baccalaureate programs to address the research questions listed above. In addition, this chapter discusses two academic fields, engineering and teacher education, in more detail. We

looked at engineering because there have been many programs added during the past decade, and we examined teacher education because of its large number of graduates and legislative concerns about placement rates.

METHODS AND DATA SOURCES

Most universities are organized into departments that provide instruction in broad disciplines.

Most baccalaureate institutions are organized into departments, each providing instruction in a broad discipline such as political science, chemistry, or art. Typically, departments offer more than one program leading to a degree. For example, a foreign language department might offer separate degrees in German, French, and Spanish. A department provides instruction to students who have enrolled in its degree programs, as well as students who take courses to meet institutional requirements for general education or electives.

In this chapter's initial discussion of instructional duplication, we use *degree programs* as our unit of analysis. In subsequent discussions of program efficiency, however, we use academic *departments* as our unit of analysis, for several reasons. First, it is common for programs within departments to be closely related. Degree programs within a department often share faculty and some coursework, so the efficiency of one program can depend on its links with others. Second, institutions keep records of the number of graduates from degree programs, but they usually do not track the enrollment, costs, and staff for individual programs. Knowing only the number of graduates might not provide a sufficient basis for evaluating programs, however, because programs offer instruction both to their own student majors and to students majoring in other fields.

Baccalaureate programs have more complex missions than the two-year occupational programs discussed at length in Chapter 2, and this makes it more difficult to evaluate them. In particular,

- While job preparation is the sole focus of many occupational programs, it is one of many goals for students at baccalaureate institutions. For example, four-year institutions strive to produce broad-minded students who can think critically and be responsible citizens.

- Research and community service are an integral part of some baccalaureate programs, in addition to direct instruction. This is particularly true at the University of Minnesota, the state's major research institution.

This chapter discusses the extent to which instructional programs have sufficient enrollments, are cost-effective, and successfully place graduates in work or continued education. We have used these limited but important measures of program viability to suggest possible areas for further review by the systems and institutions. However, there are many aspects of baccalaureate programs that are difficult to measure or were beyond the scope of this study. For

example, we have not systematically examined the quality of teaching and research, graduation and retention rates, and the contributions of programs to the broader missions of their institutions.

We supplemented our data analysis with visits to 7 of the state's 10 baccalaureate institutions, as well as numerous phone contacts. During each visit, we met with the administrator in charge of academic affairs, as well as the heads of selected academic units. We did virtually no analysis of programs at Metropolitan State University because (1) most of its students individually design their baccalaureate degree programs rather than selecting one of the university's seven structured baccalaureate degree programs, and (2) it does not maintain enrollment or cost data by discipline or department, in contrast to the other universities.

Our analyses of program size are based on departmental enrollment and graduate data for fiscal years 1989 through 1991.[1] Our analysis of costs is based on 1991 data developed by the systems for their biennial cost studies. For our analysis of staffing, the most recent data was 1991 for the University of Minnesota and 1992 for the state universities. For our analysis of student placement, we obtained followup data for students graduating in the three years ending in June 1991, when available.

Our study focused on undergraduate, not graduate, instruction.

As noted in Chapter 1, the focus of our study was undergraduate instruction, not graduate-level instruction. Because of this, we excluded from our analyses of program size those departments with significant graduate-level components--specifically, those with more than 15 percent of their full-year-equivalent enrollments in graduate courses. Our rationale was that graduate instruction and research activities--which we did not study--might offset some of the effectiveness and efficiency problems faced by small departments. Our criterion excluded about two-thirds of departments at the University of Minnesota's Twin Cities campus, but relatively few departments at other campuses.[2] We did look at undergraduate costs in these departments.

In our analyses of costs per student, we distinguished between "upper division" and "lower division" instruction. Upper division courses are those intended primarily for juniors and seniors, and are usually taken to meet requirements for particular degree programs. The costs of a department's upper division coursework reflect the efficiency of its degree programs. Lower division courses are intended for freshmen and sophomores, usually to fulfill general education requirements rather than specialized requirements for a degree program. Because of the Legislature's interest in *program* efficiency and duplication, we focused most of our attention on upper division costs.

The cost data that we used represent the best available estimates of actual costs that the university systems have developed, and we think they provide a useful first step in program review. However, there may be instances in which

1 The enrollment data includes summer enrollments. We obtained enrollment data from each state university and from the University of Minnesota's central administration.

2 The largest portion of Twin Cities departments that we excluded were in medical fields.

the estimates differ from true costs. The systems (or individual institutions) allocate their departmental costs to lower and upper division instruction based on assumptions rather than detailed course-level cost information. For example, the University of Minnesota allocates departmental costs to courses based on the *average* salary of professors in that department. If lower division courses were taught mainly by instructors with below-average salaries, the University's estimates of its lower divison costs would be overstated.

We report student/teacher ratios for selected disciplines in Appendix A. Because of the data limitations discussed in the appendix, we think the ratios are less useful than cost data for evaluating undergraduate degree programs. For example, the systems' faculty staffing data do not distinguish graduate from undergraduate instruction, so the computed student/teacher ratios include students and faculty from both levels of instruction.

PROGRAM DUPLICATION

In Chapter 2, we analyzed how many sub-baccalaureate programs are in close geographic proximity to each other, and we used distances of 20, 35, and 60 miles as benchmarks. This provided an approximation of student commuting distances between programs in similar subject areas. In the case of four-year institutions, the only main campuses within 60 miles of each other are Metropolitan State University and the University of Minnesota's Twin Cities campus. Baccalaureate institutions serve fewer "placebound" students than the two-year institutions, and it is common for students to change their residence to attend a baccalaureate program. Thus, our approach in this chapter is to examine measures of program duplication and efficiency from a statewide perspective, rather than from a regional perspective. However, academic officials told us that institutions continue to attract significant portions of their student populations from the regions of the state in which they are located, and some students might not attend any baccalaureate institution if their chosen programs were not available at a nearby institution.

Ten public institutions offer baccalaureate degrees.

We reviewed the Higher Education Coordinating Board's 1992 program inventory for Minnesota's 10 public institutions that offer baccalaureate degrees. One of these institutions (Metropolitan State University) has only seven degree programs, while the rest offer a broader array of programs in liberal arts, sciences, education, and professional fields.[3] We found that:

- **Of the 230 fields in which Minnesota's public institutions offer baccalaureate degrees, about 48 percent have degree programs available at more than one institution.**

Academic fields offered at more than one location accounted for about 92 percent of Minnesota's 1991 baccalaureate graduates. Most of the non-duplicated

3 Most of Metropolitan State's students have enrolled in "individualized" liberal arts degree programs. These programs are less structured than traditional baccalaureate programs and give students considerable flexibility to select courses from various disciplines.

Duplication is common in liberal arts and sciences fields that provide the foundation for comprehensive universities.

fields are at the University of Minnesota's Twin Cities campus. Table 3.1 shows the baccalaureate fields available at more than one institution. The most commonly duplicated programs are in liberal arts and sciences fields that traditionally provide the academic foundation for comprehensive universities. In addition, all of Minnesota's public universities except Metropolitan State have teacher education programs. Five of the state universities were established by the Legislature between 1860 and 1919 explicitly for the purpose of training teachers.[4]

Although universities, by definition, must offer coursework in traditional liberal arts and sciences fields, it is possible that some instructional degree programs in these fields are inefficient. Baccalaureate programs should be judged not simply by whether they duplicate each other, but by their costs per student and measures of program quality. As we discuss in coming sections, some programs in these fields are relatively small and expensive, or have had limited success placing their graduates. In these cases, institutions should consider limiting the number of degree options offered, or exploring cooperative degree programs with other institutions.

PROGRAM SIZE

Academic administrators generally agree that departments and programs must achieve a certain "critical mass" of students and faculty to be efficient and effective. This is not to say that "larger is better" in higher education. For example, the Morris campus of the University of Minnesota is the state's smallest four-year campus and has many small departments, but it is highly regarded for the quality of its instruction and attracts many of the state's best students.[5] However, according to academic officials we talked with, programs that do not exceed minimal size levels can have problems such as those listed in Figure 3.1. These programs could be viewed as potential candidates for restructuring, consolidation, or elimination.

We did not find agreement among administrators about what constitutes minimally-acceptable program size. In 1990, the University of Minnesota's College of Liberal Arts suggested that its departments with fewer than 10 faculty should be reorganized into larger units to improve efficiency and effectiveness. The University of Minnesota's Morris campus observes a policy of not reallocating open positions away from departments that have four or fewer faculty.[6] Some state university administrators told us that, as a rule of thumb, a

4 Following World War II, the Legislature broadened the role of these institutions to include more than teacher preparation.

5 In 1991, more than 60 percent of Morris' freshmen were in the top 10 percent of their high school classes. In contrast, about 27 percent of the University's Twin Cities campus freshmen came from the top 10 percent of their classes. From *Peterson's Guide to Four-Year Colleges 1993* (Peterson's Guides: Princeton, NJ, 1992).

6 When Morris' departments with more than four faculty have open positions, the administration considers whether to reallocate the position to other campus departments.

Table 3.1: Fields in Which Baccalaureate Degrees Are Offered At More Than One Public Higher Education Institution in Minnesota

LIBERAL ARTS	
Music, general	9
English	9
Psychology	9
Political science	9
History	9
Sociology	9
Drama/theatre	9
German	9
Communications, journalism	9[a]
Spanish	8
French	8
Economics	8
Art, general	7
Philosophy	7
Social work	6
Speech/rhetoric/communication	6
Geography	5
Anthropology	5
Music-general performance	5
Social sciences, general	5
American studies	5
International relations/studies	4
Urban affairs	4
Latin American studies	3
Art history	3
Criminal justice	3
Women's studies	3
Fine/studio arts	3
Humanities	3
American Indian studies	2
Public administration	2
Graphic/illustration design	2
Legal assistant	2
Criminology/sociology of law	2
Jazz studies	2
Music theory/composition	2
Applied psychology	2
Music industry	2
SCIENCE, TECHNOLOGY, ENGINEERING AND HEALTH	
Computer and information science	10[b]
Chemistry	9
Physics	9
Mathematics	9
Biology	9
Medical technology	7
Nursing	6[c]
Geology	5
Community health	5
Speech/language pathology	4
Industrial/manufacturing technology	4
Earth & planetary science	3
Electrical engineering	3
Cytotechnology	2
Biochemistry	2
Astronomy	2
Industrial/manufacturing engineering	2
Mechanical engineering	2
Electronic engineering technology	2
Physical therapy	2
Communication disorders	2
Industrial arts	2
Materials engineering	2
Chemical engineering	2
Mathematical statistics	2
TEACHER EDUCATION	
Elementary	9
Physical education	8
Mathematics	8
Music	8
English	8[d]
Art	8[d]
Health	7
Life science/biology	6
Physical science	6
German	6
French	6
Spanish	6
Social studies	6[d]
Speech/theatre	5
Business	5
Early childhood/kindergarten/family education	5[d]
Technical education	4
Technology/industrial arts	4[d]
General science (grades 5-9)	3
Special education	3
Middle & high school teaching	2
Home economics	2[d]
Science, general	2[d]
Social science	2
BUSINESS	
Accounting	9
Business administration and management	9
Office supervision and management	4
Marketing	4
International business	3
Finance	3
Hotel/motel/restaurant management	2
Computer information systems	2
OTHER	
Individualized studies	6
Physical education (non-teaching)	4
Parks/recreation/leisure studies	3
Parks/recreation/leisure facilities mgmt.	2
Law enforcement/police science	2
Home economics	2
Environmental studies	2
General studies	2

Source: December 1992 Higher Education Coordination Board program inventory.

[a]Includes three institutions with General Communications programs, five with Mass Communications, and one with Journalism.
[b]Includes six institutions with Computer and Information Science programs, two with Information Sciences and Systems, and three with Computer Science (one institution is duplicated).
[c]Includes three registered nurse programs and three programs that enable RNs to complete their baccalaureate degrees.
[d]The number of institutions shown includes one institution which offers a post-baccalaureate degree but no baccalaureate degree. In all but one case, this institution is the University of Minnesota.

Figure 3.1: Potential Problems With Small Academic Departments or Programs

PROGRAM QUALITY AND EFFECTIVENESS

- Continuity problems when faculty members resign or go on leave;
- Inability to provide students with sufficient breadth of courses and viewpoints;
- Inability to offer required courses often enough;
- Not enough students to comprise a "community of learners" who can exchange ideas and learn from each other;
- Difficulty maintaining a strong reputation and attracting good faculty;
- Faculty must spend some of their time on governance, which takes away time from instruction and research.

PROGRAM EFFICIENCY

- Costs per student may be higher if (1) the program requires significant investment in facilities, equipment, or supplies, or (2) the small program size results in smaller class sizes;
- Requires some expenditure for departmental administration and support staff;
- May have less flexibility in a small unit than in a larger one to make changes in budget, staffing, and space utilization.

degree program should have at least 3 faculty and 10 graduates a year to be considered viable.

Other states target small programs for further review.

Higher education governing and coordinating boards in many states have guidelines about minimum program size. These boards target small programs for further review or perhaps elimination. Based on our contacts with other states, we found that the thresholds that trigger scrutiny of baccalaureate programs range from 5 to 10 graduates per year.[7]

Minnesota's Higher Education Coordinating Board (HECB) periodically issues reports on programs with low numbers of graduates. For example, HECB reported that 27 percent of Minnesota's baccalaureate programs at public institutions averaged less than five graduates per year over a recent five-year period.[8] However, many of the programs that HECB identified as having few graduates were secondary teacher education programs, such as English education. These programs are typically inexpensive to offer because they draw

7 The thresholds used in various states include: Wisconsin-5; Tennessee-10; Virginia-5; Ohio-10; Rhode Island-5; North Dakota-8; and Arizona-10 for duplicated programs, and 5 for non-duplicated programs. These thresholds are for individual degree programs, not departments or disciplines.

8 Higher Education Coordinating Board, *A Review of Trends in the Number of Graduates from Existing Minnesota Post-Secondary Instructional Programs 1984-85 to 1988-89* (St. Paul, June 1992), 36.

mainly from courses that the institutions would offer even without a teacher education degree in this field.[9]

For our review of small programs, we chose a different approach than the one taken by HECB. First, we used departments, rather than degree programs, as the basis for our analysis.[10] In addition, we focused our review on departments with:

(1) Relatively low numbers of graduates *and* relatively low full-year-equivalent enrollments; or

(2) Relatively few faculty members.

To estimate the number of graduates in departments, we contacted officials in each institution to determine the departments that are predominantly responsible for teaching courses in particular degree programs. In the case of secondary teacher education majors, we assigned these graduates to the departments of their subject area specialization rather than to education departments. Thus, for example, we assigned English education graduates to their institution's English department.[11]

Minnesota universities have many small departments.

Table 3.2 shows departments that, by selected measures, were small in size. We excluded departments from this list that do not have degree programs.[12] As expected, we found that small institutions tended to have more small departments.

Overall, within the state university and University of Minnesota systems, we found that:

- **About 18 percent of the 244 departments that predominantly teach undergraduate students have fewer than 10 graduates *and* 140 FYE students per year.**

- **About 11 percent of departments have fewer than 3 faculty, 26 percent have fewer than 5, and 58 percent have fewer than 10.**

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9 As we discussed in Chapter 1, Minnesota's historical lack of a useful definition of a "program" also raises questions about the usefulness of HECB's analysis.

10 Two small institutions, Southwest State University and the University of Minnesota's Morris campus, have departments that oversee several distinct academic disciplines. In these two cases, we have, to the extent possible, examined data by discipline rather than by department.

11 Most institutions have some majors that are interdisciplinary and are not connected with any single department. We did not assign the graduates of interdisciplinary majors to departments.

12 We selected these thresholds for the following reasons. *140 FYE:* the smallest one-third of state university departments have less than 140 FYE. *10 or fewer graduates:* the smallest one-third of state university departments have 10 or fewer graduates per year, and several states use thresholds of 5 to 10 graduates per year to evaluate individual degree programs. *Less than 3 FTE faculty:* most administrators suggested that degree programs need at least 3 faculty to be viable. *3.0-5.0 faculty:* Most departments have more than one degree program, in which case they should have more than 3 faculty to be considered viable. We think that 5.0 FTE is still quite small, since it is half the minimum size that the University of Minnesota's College of Liberal Arts set for its departments.

Table 3.2: Relatively Small Undergraduate Departments in Minnesota Public Universities

		Departments With:				
University	Department	Less than 140 FYE and 10 Graduates Annually	Less than 140 FYE (But More Than 10 Graduates Annually	Less than 10 Graduates (But More Than 140 FYE) Annually	Less Than 3 FTE Faculty	3.0 - 5.0 FTE Faculty
St. Cloud State	Philosophy			X		
	Theatre/Film			X		
	Earth Science			X		
	Physics/Astronomy			X		
	Electrical Engineering		X			
Mankato State	Technical Education	X			X	
	Theatre			X		
	Anthropology			X		X
	Ethnic Studies	X				X
	Mechanical Engineering	X				X
	Physics			X		
	Social Work		X			X
	Manufacturing Engineering Tech		X			X
	International Business		X			X
	Recreation/Parks/Leisure		X			
	Mass Communications					X
	Philosophy			X		
	Dental Education		X			X
Winona State	Art		X			
	Foreign Language	X				X
	History			X		
	Music	X				
	Political Science			X		X
	Chemistry			X		
	Engineering		X			X
	Geology	X				X
	Physics	X				
	Business Education		X			X
Bemidji State	Humanities	X			X	
	Languages	X				
	Philosophy	X			X	
	Speech/Theatre	X			X	
	Economics	X			X	
	Geography	X				X
	American Indian Studies	X			X	
	Political Science	X			X	
	Environmental Studies	X			X	
	Mass Communications		X			X
	Music		X			
	Criminal Justice		X		X	
	Chemistry		X		X	
	Nursing		X		X	
	Physics		X			X
	Visual Arts			X		
	History			X		X
Moorhead State	Economics			X		
	Nursing		X			X
	Physics/Astronomy			X		
	Industrial Studies		X			
	History			X		
	Philosophy			X		
	Chemistry			X		
	Social Work		X			
Southwest State	Accounting		X			X
	Business Education	X			X	
	Art	X			X	
	English			X		
	Sociology/Anthropology					X
	Chemistry	X				X

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Table 3.2: Relatively Small Undergraduate Departments in Minnesota Public Universities, continued

		Departments With:				
University	Department	Less than 140 FYE and 10 Graduates Annually	Less than 140 FYE (But More Than 10 Graduates Annually	Less than 10 Graduates (But More Than 140 FYE) Annually	Less Than 3 FTE Faculty	3.0 - 5.0 FTE Faculty
Southwest State (continued)	Physics	X			X	
	Electrical Engineering Technology		X		X	
	Mechanical Engineering Technology	X			X	
	History	X				X
	Political Science	X			X	
	Social Work	X			X	
	Agribusiness	X			X	
	Hospitality/Retail		X		X	
	Marketing		X		X	
	Music	X				X
	Psychology		X			X
	Biology		X			X
University of Minnesota-Twin Cities	African-American and African Studies	X				
	Scandinavian Studies	X				
	South Asian/Middle Eastern Studies	X				X
	American Indian Studies	X			X	
	Chicano Studies	X			X	
	Russian and East European Studies		X			
	Women's Studies	X				X
	Plant Biology	X				
	Forest Products		X			X
	Astronomy			X		
University of Minnesota-Duluth	Women's Studies	X			X	
	Chemical Engineering	X				
	Theatre		X			
	Industrial Engineering		X			
	Foreign Languages		X			
	Geology		X			
	Computer Engineering		X			
	Physics			X		
	Geography			X		
	Philosophy and Humanities			X		
	Music			X		
University of Minnesota-Morris	Physical Education	X			X	
	Art	X				X
	Languages		X			
	Speech		X			X
	Music	X				
	Philosophy	X				X
	Theatre	X			X	
	Computer Science	X				X
	Geology	X				X
	Physics	X				X
	History	X				
	Political Science		X			X
	Biology		X			
	Chemistry		X			
	Sociology		X			X

Note: Excludes departments in which more than 15 percent of FYE students are in graduate-level courses. Excludes departments that do not have degree programs.

Source: Program Evaluation Division analysis of state university and University of Minnesota data: three-year average of data on undergraduate enrollment and number of graduates (FY 1989-91); FY 1991 or 1992 faculty data.

In many cases, the small departments are in fields that are duplicated at all four-year campuses: core liberal arts and sciences fields that must be taught in some fashion at all comprehensive universities. For example, philosophy and physics departments are relatively small at all of the state universities, but these departments offer courses that are central to the missions of baccalaureate institutions.[13]

While we do not intend to suggest that institutions should eliminate all coursework in the subject areas shown in Table 3.2, we recommend that:

- **Institutions should consider whether to (a) eliminate some degree programs in these areas, while continuing to offer general education and elective courses, or (b) merge small departments with other departments.**

In selected cases, departments might continue offering the first two to three years of courses in a subject area, but rely on other public or private institutions in the region to provide more specialized upper division courses. Some administrators told us that institutions have not adequately explored this option.

Some institutions have eliminated or merged small departments.

There *have* been recent examples of institutions eliminating or merging small departments to improve instructional efficiency or effectiveness. For example,

- The University of Minnesota's Twin Cities campus closed its departments of humanities and linguistics, and consolidated administration of several other liberal arts departments.
- The University of Minnesota's Duluth campus is in the process of merging its two teacher education departments.
- St. Cloud State University eliminated its business education and office administration department in order to focus resources on higher priority programs.
- Mankato State University merged its business law department into its general business department.

In some cases, particularly at the Southwest State and Morris campuses, departments administer programs in more than one academic discipline, so the institutions have already reaped some of the cost savings possible from consolidating small academic units. For example, Southwest State's psychology, sociology, social work, and anthropology programs are part of a single department. The administrative savings from mergers are usually modest, and institutions often merge academic units for the purpose of improving coordination between related fields.

13 Some fields shown in this table, such as social work, tend to have relatively low enrollments but large numbers of graduates. For example, Mankato State's social work department averaged 41 graduates a year during the three years shown.

Institutions should review programs with few graduates.

We think there are small academic units besides those shown in Table 3.2 that should be subject to institutional review. Our focus in Table 3.2 was on departments, not individual degree programs. But there may be instances in which relatively large departments have individual programs that are small and potentially inefficient. We recommend that:

- **HECB should periodically ask systems to justify the continued existence of individual baccalaureate degree programs with an annual average of 10 or fewer graduates.**

We have not listed these individual programs, in part because there has been no consistency in the definition of "program" used by the higher education systems. In addition, judgments about the need for individual degree programs requires more detailed consideration of the links between each program and others in the same institution.

Finally, although we excluded from our analysis departments with more than 15 percent of their credit hours in graduate-level instruction, some of these departments are also very small and should be subject to review. For example:

- The University of Minnesota's Twin Cities campus has two biochemistry departments--one in the College of Biological Sciences and one in the Medical School. The departments are relatively small (140 and 90 FYE students respectively in all levels of instruction), and faculty often teach in both departments. These departments collaborate on doctoral-level instruction.

- About one-fourth of the 79 Twin Cities campus departments we excluded from our review of program size have less than 10 faculty members. For example, most of the departments in the Colleges of Agriculture and Natural Resources are predominantly undergraduate and small--typically with fewer than 10 faculty or 100 full-year-equivalent students.[14]

The University's College of Liberal Arts has initiated a review of its small academic units, and we think other parts of the University should follow suit. We recommend that:

- **The University of Minnesota should review all departments with fewer than 10 faculty or 100 FYE students to determine whether departmental mergers would improve efficiency or effectiveness.**

14 We excluded most of the Agriculture and Natural Resources departments from our analysis because they had more than 15 percent of their students in graduate courses. However, undergraduates represented more than 50 percent of the FYE enrollments in most of these departments.

PROGRAM COSTS AND STAFFING

In the previous section, we noted that small departments sometimes have difficulty providing high quality and cost-effective instruction. This section looks in more detail at costs and staffing in various program areas. Comparisons between institutions are subject to the cautions discussed below. However, given that there is considerable overlap in the programs offered by baccalaureate institutions, such comparisons can be a point of departure when trying to judge whether duplication is necessary and affordable.

Some academic disciplines, by their nature, have high costs and staffing. For example, technical programs such as engineering require considerable investment in equipment, and they provide "hands-on" instruction by keeping class sizes small. Music programs require more individual or small group instruction than most programs, so their costs are usually higher. Because of these inherent differences in academic fields, we have not identified departments with high costs using a single standard (such as all programs with costs greater than $4,000 per FYE student). Instead, we have identified departments with high costs or staffing compared to others in similar disciplines.

Precautions About Comparisons

We compared direct instructional spending in various disciplines.

Comparisons of costs and student/teacher ratios among baccalaureate institutions in Minnesota's public higher education systems must be done with considerable caution. The University of Minnesota, particularly the Twin Cities campus, has a broader mission than the state universities. Both systems provide undergraduate instruction, but the University provides more research and public service activities. As a result, the University's instructors usually devote less time to classroom instruction than do state university faculty. Recent studies showed that the average state university faculty member teaches about 11 hours per week, while the University of Minnesota's averages range from 9.6 hours per week at the Twin Cities campus to 10.7 hours at the Morris campus.[15]

The University of Minnesota's greater breadth has implications for inter-system comparisons of undergraduate program costs. We used data on state-funded "direct instructional expenditures," which includes instructor salaries for teaching, research, and community service, as well as supply and equipment expenditures. Thus, in academic disciplines in which the University of Minnesota has higher costs than state universities, these differences might be

15 The university systems prepared estimates that the Higher Education Coordinating Board will incorporate into a report on faculty workloads to the 1993 Legislature.

partly explained by the University's more comprehensive mission rather than differences in efficiency.[16]

In addition, costs differ among institutions partly because of salary differences. The University of Minnesota has higher average faculty salaries than state universities.[17]

Another reason to be cautious about comparisons among institutions is that differences in costs and staffing may reflect differences in curriculum and program quality. For example, biology programs that have laboratory requirements in introductory courses are likely to be more expensive than those that do not. Also, it is more expensive to have lab supervision provided by faculty rather than by graduate assistants or other non-faculty staff.

Analysis

We focused on "upper division" costs.

For purposes of evaluating undergraduate *degree programs*, we think it is more useful to review cost data for upper, rather than lower, division courses. Students are more likely to take lower division courses to fulfill general education requirements, and upper division courses to meet requirements for particular majors. Thus, upper division costs provide more insight into the efficiency of degree programs and the "marginal cost" of offering specialized courses in particular fields. It is worth emphasizing that the costs reported in this chapter are costs per FYE student for specialized courses in individual disciplines, not the cost of all courses required by a student for a baccalaureate degree. For example, in addition to the upper division courses discussed in this section, an engineering student would take a variety of general education and elective courses in non-engineering disciplines. These non-engineering costs are not reflected in the costs per student that we report for the engineering discipline.

Table 3.3 shows upper division costs per student for selected disciplines at Minnesota's public baccalaureate institutions.[18] We found that, despite the University of Minnesota's broader mission:

16 We used data developed by the systems for their biennial cost studies as part of the average cost funding process. Direct instructional cost excludes specially-funded research projects, but includes other research that is part of normal faculty workloads. For externally sponsored research, we were only able to identify administrative and "cost-sharing" expenditures for colleges, not departments. To exclude these expenditures from departmental instructional costs, we divided these expenditures in each college by total college instructional expenditures, and adjusted each department's instructional spending by this percentage.

17 "Annual Report on the Economic Status of the Profession, 1991-92," *Academe* (March-April 1992), 52. Average salaries for full professors were $63,000 at the University's Twin Cities campus, $54,600 at the Duluth campus, $50,000 at the Morris campus, and $48,000 to $50,000 in the state university system.

18 Appendix B shows lower division costs in various disciplines. Previous studies have indicated that, on average, upper division costs per student are about 50 percent higher than lower division costs. See Paul T. Brinkman, "Instructional Costs Per Student Credit Hour: Differences by Level of Instruction," *Journal of Education Finance*, No. 15 (Summer 1989), 34-52.

Table 3.3: Fiscal Year 1991 Upper Division Costs Per FYE Student, Selected Disciplines

	State Universities	University of Minnesota-- Twin Cities	University of Minnesota-- Duluth
LIBERAL ARTS			
Anthropology/Sociology	$3,462	$2,958	$2,619
Economics	3,847	2,129	4,102
History	4,254	3,108	2,683
Political Science	3,058	3,824	3,534
Psychology	2,673	1,827	2,587
Art	4,368	3,308[a]	4,174
Music	8,753	8,238	6,487
Philosophy	5,774	3,304	2,604
Geography	3,341	3,631	3,725
German, French, Spanish	5,037	6,112	5,443
English	3,047	2,509	3,305
Speech	1,776	2,812	2,473
Theatre	8,217	5,367	3,826
Mass Communications	4,701	4,711	--
Women's Studies	3,816	2,509	5,808
American Indian Studies	--	4,034	5,732[b]
SCIENCE AND ENGINEERING			
Math	4,759	3,622	3,111
Physics	8,532	5,714	6,888
Geology	14,393	18,920	6,084
Chemistry	7,786	9,019	4,703
Biology	6,206	6,568	4,374
Computer Science	4,395	5,158	5,387
Engineering	13,587	7,648	12,727
BUSINESS			
Accounting	2,866	3,827	4,630
Other Business[c]	2,761	4,559	3,859
EDUCATION			
Teacher Education	3,052	6,145	4,725
Physical Education	3,979	4,726	2,711
Technical Education	5,051	12,820	5,973

Source: Program Evaluation Division analysis of 1991 average cost funding reports of the University of Minnesota and State University Board office.

[a]Includes studio arts ($5,388) and art history ($2,358).
[b]Department does not offer degree programs.
[c]Does not include business education or hospitality.

- **The University of Minnesota's Twin Cities campus has lower costs per student than the state universities for upper division instruction in most liberal arts disciplines.**

The pattern is less clear in other disciplines. For example, the state universities have lower costs than the Twin Cities campus in chemistry, biology, and computer science, but higher costs in math, physics, and engineering. On average, the state universities have significantly lower costs per student in most business and teacher education disciplines.

It is likely that a key reason for the Twin Cities campus' low costs per student in liberal arts is its high student/teacher ratios. Compared to other research universities nationally, the University of Minnesota has below-average numbers of faculty in most liberal arts disciplines. Appendix C compares the University of Minnesota's 1991 student/teacher ratios with the median 1987 ratios in comparable disciplines at other major research universities. In making these comparisons, we excluded departments in which more than 15 percent of the credit hours taught were at the graduate level. The appendix indicates that in 19 of 21 liberal arts disciplines, the University's student/teacher ratio was higher than the median of its peers--often substantially higher. Appendix A contains additional information on student/teacher ratios in Minnesota universities.

Figure 3.2 lists individual university departments that, in our view, are noteworthy for unusually high upper division costs per student or low student/teacher ratios. Many of the departments on this list were also identified in Figure 3.1 because of their small size. The smaller state universities--particularly Southwest and Bemidji--account for many of the departments on these lists. In disciplines such as biology and math, it is probably important for each of the state's public institutions to continue offering degree programs in order to fulfill the missions of comprehensive universities. However, it is also apparent that small universities and departments have a more difficult time providing cost-effective instruction than their larger counterparts.[19]

There are justifications for some high cost programs, but others should be restructured.

We recommend that:

- **The University of Minnesota and state university systems should periodically identify departments with relatively high upper division costs or low staffing. In these cases, the institutions should consider options such as (a) offering fewer majors or concentrations, (b) restructuring existing degree programs, perhaps with strengthened links to programs at other institutions, or (c) eliminating the department.**

There may be justifications for some high cost departments. For example, administrators at the University of Minnesota's Duluth campus believe that their women's and Native American studies departments bring necessary diversity to the campus' curriculum, despite their high costs. Also, the University's chemical engineering program on the Twin Cities campus is regarded by some as the best department of its type in the nation. In addition, there may be instances in which the state is willing to accept high program costs as the price for making programs more accessible to Minnesota residents.

19 We analyzed economies of scale in selected disciplines offered by Minnesota's state universities, but the small number of institutions made it difficult to obtain results that were statistically significant. The best national research on economies of scale suggests that when institutional enrollments increase 300 to 400 percent, instructional expenditures per student decline 16 percent. Most economies of scale are achieved by the time enrollment reaches 2,000 FYE students in liberal arts colleges, and 3,000 in comprehensive universities. See Larry L. Leslie and Paul T. Brinkman, "Educational Finance: Higher Education," in *Handbook of Research on Educational Administration*, Norman J. Boyan, ed. (White Plains, NY: Longman, Inc., 1988), 415-429.

Figure 3.2: University Departments With High Costs or Low Student/Teacher Ratios

Institution, Department	Comparison of Fiscal Year 1991 Cost Per Student With Similar Programs (Upper Division Costs Unless Otherwise Noted)[a]
SOUTHWEST STATE	
Mass Communication	Cost ($9,511) was 102% above system average ($4,701)
Teacher Education	Cost ($4,488) was 47% above system average ($3,052) and student/teacher ratio (16.7) was lowest among state universities
Physical Education	Cost ($5,768) was 45% above system average ($3,979)
Electrical Engineering Technology	Cost ($8,563) was 125% more than Mankato State's mechanical engineering tech program ($3,810)
Mechanical Engineering Technology	Cost ($12,753) was 235% higher than Mankato State's mechanical engineering tech program ($3,810)
English	Cost ($4,347) was 43% above system average ($3,047)
Biology	Cost ($10,223) was 65% above system average ($6,206)
Math	Cost ($6,142) was 29% above system average ($4,759)
Physics	Cost ($33,010) was 287% above system average ($8,532)
History	Cost ($6,370) was 50% above system average ($4,254)
Agribusiness	Program was only one of its kind in state, but its costs ($7,794) were high compared to those of business programs
Business Education	Cost ($5,377) was 72% above the average of the system's three least expensive programs ($3,129)
BEMIDJI STATE	
Nursing	Cost ($10,953) was 69% above system average ($6,493)
Biology	Cost ($9,399) was 51% above system average ($6,206)
Physics	Cost ($19,735) was 131% above system average ($8,532)
Chemistry	Cost ($12,185) was 56% above system average ($7,786)
Economics	Cost ($6,564) was 71% above system average ($3,847)
Political Science	Cost ($4,870) was 59% above system average ($3,058)
Art	Cost ($8,319) was 90% above system average ($4,368)
Music	Cost ($13,687) was 56% above system average ($8,753)
Environmental Studies	Program was the only one of its kind in state, but its lower division ($10,974) and upper division ($21,519) costs were among the highest in the state university system
Philosophy	Cost ($23,380) was 315% above system average ($5,774)
Sociology/Anthropology	Cost ($5,803) was 70% above system average ($3,416)
WINONA STATE	
Accounting	Cost ($4,102) was 43% above system average ($2,866)
Business Education	Cost ($9,853) was 89% above system average ($5,214)
Mass Communication	Cost ($5,225) was higher than comparably-sized programs at other state universities
Physical Education	Cost ($4,891) was 23% above system average ($3,979), and student/teacher ratio (18.7) was low
English	Cost ($4,841) was 59% above system average ($3,047)

Figure 3.2: University Departments With High Costs or Low Student/Teacher Ratios, continued

Institution, Department	Comparison of Fiscal Year 1991 Cost Per Student With Similar Programs (Upper Division Costs Unless Otherwise Noted)[a]
Winona State, continued	
Biology	Cost ($7,642) was 23% above system average ($6,206)
Chemistry	Cost ($9,592) was 23% above system average ($7,786)
Political Science	Cost ($5,133) was 68% above system average ($3,058)
Music	Cost ($12,457) was 42% above system average ($8,753)
Geology/Earth Science	Cost ($16,940) was 45% higher than costs in the system's other geology/earth science program ($11,658)
Engineering	Cost ($24,504) was highest of any engineering program in state
MOORHEAD STATE	
Biology	Cost ($9,706) was 56% above system average ($6,206)
Computer Science	Cost ($6,313) was 44% above system average ($4,395)
Chemistry	Cost ($10,552) was 35% above system average ($7,786)
History	Cost (11,888) was 179% above system average ($4,254)
Art	Lower division costs ($5,317) were 60% above system average ($3,319), and student-teacher ratio (15.5) was low
Psychology	Cost ($3,668) was 37% above system average ($2,673)
MANKATO STATE	
Communication Disorders	Cost ($6,562) was 62% above system average ($4,052)
Accounting	Student/teacher ratio (18.9) was lowest among the state's public universities
Mechanical Engineering	Cost ($21,938) was second highest among state's engineering programs
Technical Education	Undergraduate cost ($10,247) is 151% above state average ($4,081)
Dental Education	Lower division costs ($12,784) for this associate degree are 146% higher than those in the state's other two year program (Normandale Community College)
ST. CLOUD	
Math	Cost ($5,971) was 25% above system average ($4,759)
Music	Cost ($16,645) was 90% above system average ($8,753)
Electrical Engineering	Cost ($15,699) was the highest in the state university system for any department with more than 50 upper division FYE students.
UNIVERSITY OF MINNESOTA, TWIN CITIES	
African-American/African Studies	Student/teacher ratio (13.8) was low and cost ($4,440) was high compared to other liberal arts departments
Scandinavian Studies	Cost ($6,872) was high and student/teacher ratio (15.5) was low compared to other liberal arts departments

Figure 3.2: University Departments With High Costs or Low Student/Teacher Ratios, continued

Institution, Department	Comparison of 1990-91 Cost Per Student With Similar Programs (Upper Division Costs Unless Otherwise Noted)[a]
University of Minnesota, Twin Cities, continued	
Plant Biology	Cost ($12,500) was nearly twice as high as University's other biology departments, and student/teacher ratio (7.6) was lower
Spanish/Portuguese	Most expensive of the University's foreign language and literature departments ($7,645)
Teacher Education	Cost ($6,144) was twice the state university average
Vocational/Technical Education	Cost ($12,817) was highest of any public university education department
Physical Education	Cost ($4,726) was higher than state university average ($3,979) or Duluth's ($2,711)
International Studies	Cost ($6,344) was high compared to University's other liberal arts departments
Communication Disorders	Cost ($13,842) is highest in University's College of Liberal Arts.
Agricultural and Applied Economics	Cost ($5,192) is more than two times higher than the University's Economics Department cost ($2,129)
Agronomy and Plant Genetics	Cost ($11,373) is among the University's highest
Animal Sciences	Costs ($11,453 lower division and $11,703 upper division) are among the University's highest
Food Science and Nutrition	Cost ($12,471) is among the University's highest
Social Work	Cost ($21,877) is among the University's highest
Forest Products	Cost ($8,444) is among the University's highest
Horticulture	Cost ($13,906) is among the University's highest
Accounting	Upper ($3,826) and lower ($3,780) division costs are much higher than state university averages
Chemical Engineering	Cost ($15,096) is highest of the campus' engineering programs
UNIVERSITY OF MINNESOTA, DULUTH	
Economics	Cost ($4,101) was twice as high as that on Twin Cities campus ($2,129)
Composition	Cost ($3,593) was twice as high as that on Twin Cities campus ($1,806)
Women's Studies	Cost ($5,968) was more than twice as high as that on Twin Cities campus ($2,509)
American Indian Studies	Cost ($5,733) was 39% higher than cost on Twin Cities campus ($4,034)
Engineering	Cost ($12,730) was 66% higher than cost on Twin Cities campus ($7,648)
Accounting	Cost ($4,630) was highest of any public baccalaureate accounting program in state
Teacher Education	Cost ($4,724) was 55% higher than state university system average ($3,052)

Note: Includes some departments that do not offer baccalaureate degree programs.

Source: Program Evaluation Division analysis of fiscal year 1991 cost reports from University of Minnesota and State University Board office, developed as part of the average cost funding process.

[a]Direct instructional costs, as allocated among instructional divisions by institutions. For departments at the University of Minnesota, "upper division" was defined as "3000-level" courses.

We estimate that if all of the departments in Figure 3.2 operated at the cost averages of their peers--or, in the case of departments without obvious peers, at a 25 percent expenditure reduction--it would be possible to save about $7 million annually. Alternatively, a 10 percent reduction in the costs of these programs would save $2.3 million annually. Savings could be reallocated to high priority or underfunded programs, or could simply be used to reduce Minnesota's overall higher education spending levels. To the extent that program reductions create significant problems of access for baccalaureate students, the state could even consider using a portion of program savings to pay for relocation or transportation costs for low income students.

Program Specialization

We have discussed some reasons that programs have high costs--notably small size and low student/teacher ratios. Another factor that can increase costs is the proliferation of specialized majors and courses. We found that:

- **Many academic administrators believe that overspecialization of baccalaureate programs is a greater threat to instructional efficiency than program duplication.**

Administrators believe that some institutions offer too many specialized programs and courses.

In a recent staff paper, Missouri's higher education coordinating board observed that:

> The most fertile ground for improving the efficiency of the instructional component of our higher education institutions is not the search for unnecessary duplication at the institutional level in a limited number of professionally related disciplines, but rather the efficient utilization of instructional resources in the main programmatic areas of business, education, and the arts and sciences.... (The potential problem is) the hidden proliferation of options and emphasis areas--a process that can have the tendency to fragment the curriculum and dilute institutional resources with clear consequences for programmatic quality and efficiency.[20]

Likewise, a recent article in the *Chronicle of Higher Education* recommended that institutions streamline their curricula, observing that:

> Too many courses are offered, and too much content is duplicated.... (D)epartmental self-interest leads to an increase in the number of courses, and individual self-interest results in the teaching of more peripheral courses. No common framework exists within which faculty members work together to rethink, revise, or cut the curriculum. The result is economically costly and intellectually incoherent.[21]

We talked with many academic administrators in Minnesota's higher education systems who expressed similar concerns. Adding an option or emphasis

20 Memo from Michael A. McManis to Missouri Coordinating Board for Higher Education, "Overview of Program Duplication Issue at Missouri Public Institutions," April 21, 1989, 10-11.

21 Marvin Lazerson and Ursula Wagener, "Rethinking How Colleges Operate," *Chronicle of Higher Education* (September 30, 1992), A44.

to an existing degree program often means adding new course requirements, which may increase faculty workloads or create pressures to hire additional faculty. For example, Mankato State and Winona State had mass communication degree programs with similar enrollments in 1990-91. However, Winona's degree program had five options, each with separate course requirements of about 36 credit hours; Mankato's program had two options, each with requirements of about 15 credit hours. This may be one reason why Winona State's program had costs per student nearly twice those of Mankato's in 1990-91.

It is difficult to quantify the extent to which program specialization affects costs. There is no central inventory of options and emphases at Minnesota's higher education institutions, as there is for degree programs.[22] In addition, some administrators told us that departmental expenditures do not always increase when program options proliferate. They noted that, in some cases, institutions keep costs down by sacrificing program quality--perhaps by increasing the size of introductory courses.

Limitations on Cost Reduction

Eliminating inefficient or unnecessary baccalaureate programs will not automatically reduce instructional costs. In part, this is because:

- **Four-year institutions have tenure codes and faculty contracts that limit their ability to lay off staff.**

Tenure codes and faculty contracts limit possible savings.

For example, the state university faculty contract specifies that: "No tenured faculty member who has at least 20 years of service within the Minnesota State University System or who is within 5 years of mandatory retirement shall be laid off."[23] In cases where entire programs or departments are closed, faculty are usually assigned to other departments at the same institution.

The University of Minnesota's tenure policy provides that: "In the event that programmatic change leads to discontinuation of a program in which a member of the faculty is employed, the University recognizes its obligation to continue the employment of regular faculty in accordance with the terms of their employment..."[24] When the University closed its Waseca campus in 1992, it interpreted this policy to mean that it could not lay off faculty. Many of the Waseca faculty accepted early retirement options (these no longer exist), and several others joined the faculty at other University campuses.

Although some administrators described these faculty protections as more generous than those of universities in other states, we did not conduct systematic

22 For purposes of developing its 1992 program inventory, HECB regarded options as advisory only--not separate programs.

23 Inter-Faculty Organization Agreement Between Minnesota State University Board and Inter-Faculty Organization, effective through June 30, 1993, 49.

24 Board of Regents Regulations Concerning Faculty Tenure, 25.

comparisons and offer no conclusions on the reasonableness of these provisions. However, we think it is important to observe that these policies limit the ability of university administrators to restructure academic units for the purpose of saving money or improving instructional quality.

GRADUATE PLACEMENT AND FOLLOWUP

Undergraduate liberal education serves a variety of purposes. It teaches students an appreciation of knowledge and art, how to analyze and solve problems, how to see issues from various perspectives, and how to be good citizens. In addition, undergraduate programs provide students with skills and abilities they can use to find employment. Unlike many technical college programs, baccalaureate institutions do not regard preparation of students for employment as their sole function. However, one important measure of the success of undergraduate programs is the extent to which baccalaureate graduates find satisfactory work or continue their education.

We contacted each of the public baccalaureate institutions to obtain information on the placement of their graduates. We found that:

- **There is considerable variation in the graduate followup data collected by baccalaureate institutions. In many cases, the data are of limited value to administrators for the purpose of helping make strategic program decisions.**

Followup information on graduates varies by institution.

Five of the seven state universities have a placement office that has annually surveyed all baccalaureate students in the months following graduation. As shown in Figure 3.3, these placement offices have succeeded in contacting a high percentage of former students. Of the two state universities that have not collected extensive placement data, one (Southwest State) expects to begin doing so during the next year.

The University of Minnesota does not have a central placement office that surveys former students. Colleges and branch campuses within the University are responsible for their own followup, and there has been little central guidance. Methods for collecting and reporting data have not been standardized. Some colleges collect data similar to that collected by the state universities and have relatively high response rates on their surveys. However, the larger colleges on the University's Twin Cities campus have had low response rates, or have not collected sufficient information to determine placement rates. For example, in 1991 the campus' largest undergraduate college (the College of Liberal Arts) conducted its first followup survey in five years. The survey response rate was so low (32 percent) that it was difficult to draw conclusions from the information collected.

We think that information on placement could be used by HECB or academic administrators to help determine program priorities, and it could also help pro-

Figure 3.3: Graduate Followup by Minnesota Public Universities

	Type of Placement Information[a]	Response Rate On Most Recent Placement Survey
STATE UNIVERSITIES		
St. Cloud State	Annual survey	87%
Bemidji State	Annual survey	95
Moorhead State	Annual survey	88
Winona State	Annual survey	98
Mankato State	Annual survey; results do not specify whether employed graduates are still seeking work.	98
Southwest State	Annual survey of teacher education graduates, but no surveys of other graduates.	[b]
Metropolitan State	No placement surveys because most students are already in workplace. Has done graduate satisfaction surveys.	--
UNIVERSITY OF MINNESOTA		
Duluth Campus	Annual survey	66
College of Liberal Arts	Has conducted one survey in past five years.	32
Institute of Technology	Annual survey	32
Carlson School-Business	Data collected pertains to number of job offers received. No indication of placement rates.	[c]
Morris Campus	Most recent followup survey was 1990.	76
School of Nursing	Fall 1992 survey was first ever.	--
Crookston Campus	Annual survey determines rates of placement in jobs related to training.	100
College of Natural Resources	Did a survey 3 years ago, but no report available. Conducted survey of graduates from past five years in late 1992.	--
College of Human Ecology	Annual survey; college is planning efforts to increase response rates.	50
College of Agriculture	Annual survey	94
College of Biological Sciences	Annual survey	77
College of Education	Annual survey	89

Source: Program Evaluation Division review of institution placement reports for baccalaureate and sub-baccalaureate programs.

[a]Unless specified, all of the annual surveys ask graduates whether they are employed, seeking work, continuing their education, or following other pursuits (such as homemaking or military service).

[b]Response rate was 73 percent for Southwest's survey of 1990 teacher education graduates.

[c]Unknown.

spective students make more informed decisions about what fields of study to pursue. However, there are many limitations with existing graduate followup data, and most academic administrators do not find it very useful. Followup surveys usually do not determine graduates' satisfaction with their undergraduate programs, the relevance of their programs to the jobs they take or the additional education they pursue, or their current salaries.

Teacher education is the only baccalaureate field in which all institutions routinely determine whether graduates find jobs related to their area of training. In this field, we found that:

- **Minnesota's public institutions have placed about 40 percent of their teacher education students in full-time teaching positions during the year following graduation.**

Later in this chapter, we discuss teacher placement in more detail.

Lacking information on "related" placements in non-teaching fields, we looked at the number of graduates obtaining "successful" placements, defined in two ways. In Table 3.4, Placement Rate A is the percentage of graduates who were (1) working full-time or part-time, or continuing their education, and (2) not actively seeking other employment.[25] Placement Rate B is more of a job placement rate because it disregards graduates who continued their education. Rate B measures the percentage of graduates "available" for employment who were working full-time or part-time and not actively seeking other employment. Neither of these rates assumed that graduates must be working in their major field to be successfully placed.

Because of the inconsistencies in the way institutions collect placement data and the poor response rates to many institutions' followup surveys, we were unable to determine *statewide* placement rates for graduates of baccalaureate programs. However, to provide some indication of post-graduation success in various fields, we used data from four institutions that collect similar types of data and have relatively high response rates to their followup surveys.[26] Table 3.4 shows subject areas in which placement rates were highest and lowest. We determined that about 69 percent of the graduates from non-teaching programs who were "available" for employment found full- or part-time work during the year following graduation and were not seeking other jobs.[27]

The 1991 Legislature required Minnesota's Higher Education Coordinating Board (HECB) to:

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25 It is possible that some of the graduates who are continuing their education, and thus are counted as successful placements, are doing so only because they cannot find employment.

26 None of these institutions are from the Twin Cities region, so the calculated placement rates may not adequately reflect statewide employment demand for graduates in these fields.

27 Excluding graduates who continued their education, about 80 percent of teacher education graduates "available" for employment statewide found (1) full- or part-time employment in teaching or (2) employment in non-teaching fields and were not seeking other jobs.

Table 3.4: State University Placement Rates for Graduates in Selected Baccalaureate Fields (1988-89 to 1990-91 Graduates)

Non-Teaching Fields With More than 50 Graduates	Placement Rate A[a]	Placement Rate B[b]	Systemwide Upper Division Cost Per FYE[c]
Nursing	98%	98%	$6,493
Computer science	88	87	4,395
Chemistry	88	77	7,786
Physics	87	83	8,532
Business computer	84	83	NA
Business education/office administration	83	82	5,214
Engineering	80	78	13,587
Mathematics	79	71	4,759
Accounting	77	76	2,866
Biology	77	64	6,206
Social studies	76	70	NA
Business administration, management	73	72	2,769
Legal assistant	75	74	NA
Social work	75	72	2,975
Local/urban affairs	74	69	NA
Industrial technology studies	74	73	NA
Psychology	73	65	2,673
Foreign languages	71	65	5,037
Music	70	56	8,753
Economics	70	63	3,847
Art	69	56	4,368
Marketing	69	67	2,581
Mass communication	68	65	4,701
Graphic/commercial design	67	66	NA
Finance	66	64	2,929
Political science	66	51	3,058
Personnel management	66	65	NA
Speech communication	66	62	1,776
Theatre/speech	65	57	NA
Geography	64	54	3,341
Anthropology/sociology	64	57	3,462
Community health	63	60	NA
Criminal justice	62	58	NA
English	62	48	3,047
Public administration	61	56	NA
History	61	43	4,254
Recreation	60	57	NA
Aviation	60	57	NA
International business	59	57	NA
Physical education/sports studies (non-teaching)	59	50	NA
AVERAGE	73%	69%	

Source: Program Evaluation Division analysis of institutional placement reports for St. Cloud, Moorhead, Winona, and Bemidji State Universities. Direct instructional costs are from the State University Board office's biennial cost study.

[a]Percentage of total graduates (1) continuing their education, or (2) employed and not seeking other positions. Graduates for which the institution was unable to obtain information, as well as graduates not seeking employment, were excluded from total graduates.

[b]Percentage of graduates employed and not seeking other positions. Graduates for which the institution was unable to obtain information, graduates not seeking employment, and graduates continuing their education were excluded from total graduates.

[c]Costs per student marked "NA" are not available for these individual fields.

> coordinate the development and operation of a statewide post-secondary graduate follow-up reporting system that will help students and prospective students make informed education and occupational decisions.... The coordinating board shall develop appropriate reporting procedures and mechanisms; assemble, interpret, and publish annually the information that will be provided to consumers; and develop an audit program.... The system shall also include information on all sub-baccalaureate occupational programs and all programs that lead to an occupation requiring certification, licensure, or testing for entry.[28]

The first phase of this followup system focuses on sub-baccalaureate occupational programs, and initial reporting of data by institutions will begin in October 1994. Reporting of followup data for baccalaureate programs requiring certification, licensure, or testing will begin no sooner than Fall 1995.

Currently, there are no plans to develop a coordinated reporting system for non-occupational baccalaureate programs, which account for most of the state's undergraduate degrees. We think that the inconsistency of data collection and reporting among the state's baccalaureate institutions is unacceptable. At a time when institutions have been trying to find ways to measure the "outcomes" of higher education, improved graduate followup data is one place to start. We think that graduate followup information is less important for non-occupational programs than occupational programs, but it could still provide prospective students with useful consumer information, and help policy makers and administrators make strategic program decisions. We recommend:

- **The Legislature should consider extending its requirements for a post-secondary followup system to all baccalaureate programs, to be coordinated by HECB.**

Followup surveys could be improved to provide better information for administrators and prospective students.

To minimize the costs of such a system, we recommend that statewide followup surveys for non-occupational fields be done less frequently than those for occupational fields--perhaps once every five years. HECB's primary roles would be to develop uniform survey methods and to compile results in a report.

For many degree programs, it would be difficult and perhaps impossible for followup surveys to usefully determine whether graduates are employed in fields "related" to their areas of baccalaureate study. Still, we believe that followup surveys should ask students general questions about the relevence of their education to their current work, their level of satisfaction with their degree programs, and salaries. Surveys should also determine whether graduates who continue their education are in post-baccalaureate programs related to their undergraduate field of study.

28 *Minn. Laws* (1991), Ch. 356, Art. 1, Sec. 2.

ENGINEERING PROGRAMS

In the early 1980s, the University of Minnesota's Twin Cities campus was the only Minnesota institution which offered baccalaureate degrees in engineering. As state policy makers tried to encourage development of high technology industry in Minnesota, there were increasing concerns that the state was not producing enough engineers and that the University of Minnesota's undergraduate engineering programs were at capacity.[29]

Nine engineering programs started in Minnesota during the past decade.

During the past decade, the Legislature and higher education systems funded nine new baccalaureate engineering programs at five different institutions. The programs were intended to increase the number of engineers produced in the state and strengthen economic development in various regions. Proposals for two other programs were approved by their respective governing boards, but were withdrawn after being submitted for HECB review.[30]

As we discuss in this section, we think that:

- **The creation of small engineering programs at several institutions in recent years was an expensive decision, and the higher education systems should consider options for making engineering instruction more cost-effective.**

Program Size

Despite the recent proliferation of engineering programs, Minnesota does not seem to be producing too many engineers. As shown in Table 3.5, Minnesota produces fewer engineering graduates per capita than most states. Still, according to several academic officials we interviewed, the shortage of "home-grown" engineers has not been a serious problem because surrounding states produce enough graduates to meet the demands of most Minnesota employers.[31]

One reason that Minnesota continues to produce relatively few engineering graduates is that its new programs have not produced as many graduates as initially projected. Table 3.6 shows the number of graduates initially projected

29 The Minnesota High Technology Council, a private education advocacy organization, played an important role in bringing these issues to the Legislature's attention.

30 The Duluth campus of the University of Minnesota proposed an electrical engineering program in 1991, and Bemidji State University proposed an engineering physics program in 1990. In both cases, the proposals were withdrawn after HECB staff raised questions about the need for these programs.

31 Minnesota has reciprocity agreements with Wisconsin, North Dakota, and South Dakota that allow Minnesota residents to attend school in these states and pay resident tuition rates, although Minnesota academic officials have expressed concerns about becoming too dependent on other states for programs in key academic fields. A 1986 survey found that Minnesota had the ninth highest number of employed engineers nationally (115 per 10,000 residents). The number of employed engineers per 10,000 residents in surrounding states were: Wisconsin, 96 (19th highest); Iowa 94 (20th highest); South Dakota, 48 (43rd highest); and North Dakota, 21 (49th highest). See National Science Foundation, *U.S. Scientists and Engineers: 1986* (Washington, D.C., 1987), 115-116.

Table 3.5: Number of Engineering Graduates Produced, 1990 (Selected States and U.S. Total)

	1990 Engineering Graduates Per 10,000 Residents			National Rank		
	Baccalaureate	Masters	Doctoral	Baccalaureate	Masters	Doctoral
Minnesota	1.99[a]	0.46	0.20	37	45	19
Wisconsin	3.13	0.81	0.18	15	26	22
North Dakota	6.28	0.77	0.06	1	31	41
South Dakota	5.07	1.12	0.00	4	15	50
Iowa	3.33	0.91	0.28	12	21	10
5-State Region	2.94	0.68	0.20			
U.S. Total	2.63	1.09	0.22			

Source: Engineering Manpower Commission of the American Association of Engineering Society, Inc., *Engineering and Technology Degrees: 1990* (Part I), 5-11; 1990 population statistics are from U.S. Census Bureau.

[a]Number of graduates based on 1991 data from the Minnesota Council of Engineering Deans.

Table 3.6: Recently Approved Engineering Programs--Projected and Actual Graduates and Costs

Type of Program	Institution	When Did Program Start?	Nationally Accredited?	Projected Number of Graduates	Actual Number of Graduates 1989	1990	1991	1992	Projected Dollars Per FYE[a]	Actual Dollars Per FYE 1990-91[b]
Chemical processing	UM-Duluth	1989	Yes	50	0	6	8	11	$4,660	$12,666
Composite materials	Winona State	1989	No	20	0	0	7	13	4,174	21,795
Electrical	Mankato State	1984	Yes	60	25	36	23	26	3,030	8,415[c]
Electrical	St. Cloud	1984	Yes	40	31	27	30	29	1,420	15,946
Computer/electrical	UM-Duluth	1984	Yes	100	0	26	21	34	4,810	12,227
Mechanical	Mankato	1986	No	60	5	4	10	16	2,860	19,163
Manufacturing	St. Cloud	1989	No	30	6	0	7	5	8,650	NA
Industrial	UM-Duluth	1986	Yes	90-100	0	19	31	24	2,685	13,356
Materials science	UM-Twin Cities	1986	Yes	30	19	10	12	9	1,888	NA

Source: Higher Education Coordinating Board, State University System, University of Minnesota, Minnesota Council of Engineering Deans.

[a]All of the projections shown are the costs per student at full operation. St. Cloud's manufacturing engineering program was initially projected to be fully operational in 1995-96, and Winona's program was projected to be fully operational in 1991-92. All other programs were projected to be operational before 1990.

[b]Upper and lower division costs.

[c]This cost includes Mankato's electrical engineering technology program, so the cost of the engineering program alone is probably higher than shown here.

by the institutions and the actual number of graduates over the past four years. In some cases (such as Winona State), the programs are still expected to meet their initially projected size, but there have been delays in program start-up. In most cases, the programs have simply not attracted the number of students expected, and administrators now say that the programs as currently funded could not accommodate the number of students originally projected. To some extent, the low enrollments reflect cyclical fluctuations in engineering enrollments, consistent with national trends. Administrators believe that the number of new engineers produced in Minnesota would have been even smaller without the new programs. In addition, administrators attribute Minnesota's

shortage of engineering students to inadequacies in math and science requirements in the state's high schools.

Some people we talked with believe that Minnesota has too many institutions offering engineering degrees. They suggested that this is an example of unnecessary program duplication, or at least an inefficient way to structure expensive instructional programs. To evaluate the efficiency of Minnesota's engineering programs, we first looked at program size. We found that:

- **Compared with engineering programs in other states, Minnesota's new engineering programs are small.**

Minnesota's new engineering programs are relatively small.

In 1992, the four Minnesota institutions with new engineering programs had the following number of graduates: 13 (Winona State); 34 (St. Cloud State); 42 (Mankato State); and 69 (University of Minnesota-Duluth). Table 3.7 shows information from two sources on the size of undergraduate engineering programs elsewhere. The American Society for Engineering Education annually collects information from U.S. and Canadian institutions that have at least one engineering program that is nationally accredited.[32] As indicated, the

Table 3.7: Size of U.S. and Canadian Undergraduate Engineering Programs

Percentile	Number of Graduates of Accredited Programs[a]	Number of Graduates of Accredited and Non-Accredited Programs[b]
10	39	16
20	75	44
30	107	77
40	132	111
50	172	153
60	201	190
70	253	239
80	338	329
90	533	490
100	1,239	1,316

Source: Data on accredited programs is from American Society for Engineering Education, *1992 Directory of Engineering and Engineering Technology Undergraduate Programs, 3rd Edition* (Washington, D.C., 1992), 57-61. Data on accredited and non-accredited programs is from Engineering Manpower Commission of the American Association of Engineering Societies, Inc., *Engineering and Technology Degrees: 1990, Part 1: by School* (New York, 1990).

[a]1990-91 academic year. Includes programs in U.S. and Canada. Engineering technology graduates not included.

[b]1989-90 academic year. Includes U.S. programs only. Engineering technology graduates not included.

32 U.S. engineering programs receive accreditation from the Accreditation Board for Engineering and Technology, and Canadian programs receive accreditation from the Canadian Engineering Accreditation Board.

median accredited engineering program had 172 baccalaureate graduates in 1990-91. The American Association of Engineering Societies annually collects information on American engineering programs, including those *without* accreditation. Table 3.7 shows that the median number of graduates at institutions with accredited or non-accredited programs was 153 in 1989-90. The University of Minnesota's Twin Cities campus had 738 engineering graduates in 1990-91, well above the national averages for program size.

Program Costs

The low enrollments in Minnesota's new programs may be one reason that:

- **Minnesota's new engineering programs generally have higher costs per student than originally projected, and higher costs than most engineering programs at the University of Minnesota's Twin Cities campus.**

The average direct instructional cost for upper division engineering coursework at the University of Minnesota Twin Cities campus was $7,648 in 1991, compared to $12,727 for the Duluth campus and $13,587 for the state universities. Again, it is important to consider that the mission of the University of Minnesota (particularly the Twin Cities campus) is broader than those of other Minnesota universities, as faculty are expected to conduct more research and perform more public service activities. Still, the Twin Cities campus' costs for its engineering programs are lower than those of the new programs, probably reflecting differences in program size. Because engineering programs require considerable expenditure for equipment, supplies, and facilities, they have greater economies of scale than most other areas of higher education instruction.

The original estimates of program costs were optimistic.

Table 3.6 shows that the originally projected costs of some engineering programs were enormously optimistic. HECB staff questioned the proposed costs in some of the more recent proposals. However, in several cases, the Legislature approved funding for the programs *prior* to HECB's review.[33]

Overall, we conclude that the decision to establish relatively small engineering programs at multiple locations was an expensive one. If all of Minnesota's engineering programs operated at the Twin Cities campus' average engineering costs, the state would have saved more than $1.7 million in fiscal year 1991. Alternatively, a 10 percent reduction in the costs of the new engineering programs would have saved $440,000 in 1991. Officials within both the University of Minnesota and state university systems told us that it was inefficient for programs to be added at four new institutions, rather than concentrating these programs at one or two. Although some academic officials expressed concern

33 Among non-engineering programs, HECB staff recalled only one instance where legislative funding preceded HECB review.

that the new programs might be too small to provide quality instruction, their primary concern was program efficiency.[34]

Should Engineering Programs Be Consolidated?

Although the state has made a large investment in facilities for the new engineering programs, most academic officials told us that the buildings could be reused for other purposes and the equipment moved to other program locations, if necessary. However, there are at least three important impediments to consolidating the engineering programs. First, the programs are located in two higher education systems with separate faculty contracts. This would make it difficult to merge a program at the University of Minnesota-Duluth with a similar program at one of the state universities, for example. Mergers between institutions within the same system would be more feasible.

Cost should be one of many considerations in decisions about the future of the engineering programs.

A second obstacle to consolidating engineering programs is that the affected institutions appear to have strongly embraced them. Academic administrators believe that the programs have (1) attracted very high quality students and faculty, (2) enabled institutions to upgrade related departments such as physics and chemistry, and (3) improved university relationships with regional businesses and industries, and spurred economic growth. They believe that strong science and technology programs are central to the mission of a comprehensive university, and that the new engineering programs are a source of institutional pride. Administrators think these programs are still young and need a chance to prove themselves. To consider changing them now might threaten faculty-management relations and institutional reputations, they told us.

The third obstacle to consolidation is the cost of developing facilities to accommodate merged programs. Administrators at all four of the new engineering campuses told us that they have capacity to house additional students or programs in existing facilities. However, we think a more precise calculation of the costs of moving programs should precede any decisions on consolidation.

In our view, the case of Minnesota's engineering programs illuminates a key flaw in the state's program review process. Specifically, institutions are not adequately held accountable for projections they make at the time they propose new programs. We recommend that:

- **HECB should ask the state university and University of Minnesota systems to prepare reports by August 1994 explaining or justifying changes from the original proposals for all engineering programs started since 1983. These reports should include proposed benchmarks for program quality, size, cost-effectiveness, student placement, and external funding. The Legislature should ask HECB to prepare a report for the 1995 legislative session on the**

34 Generally, academic officials made positive comments about the quality of the programs in institutions other than their own. It is worth noting that the national engineering accrediting organization prohibits institutions from publicly revealing the contents of its accreditation reports, which we think restricts public accountability for these programs.

merits of consolidating engineering programs, including a cost analysis.

In light of the state's fiscal difficulties, program consolidation should be fully explored, despite the impediments noted above. Ultimately, state policy makers and system officials will need to decide whether the benefit of having programs at multiple locations is worth the additional expense. However, we think that the high cost of engineering programs and their importance to the state's economy require that they be held to particularly high standards of accountability.

TEACHER EDUCATION PROGRAMS

In recent years, state policy makers have had concerns about the number of teacher education graduates being produced in the state. For example, some studies have shown that less than half of Minnesota graduates obtain full-time employment as teachers during their first year out of school. The apparent surplus of teachers has led some people to question whether too many of Minnesota's public institutions offer teacher education programs or whether existing programs should reduce their enrollments. In this section, we review the evidence regarding teacher supply and demand, and the size and cost of Minnesota's public teacher education programs. We conclude that:

- **There is a large teacher surplus in Minnesota, and institutions should scrutinize high cost programs and continue to make efforts to ensure that prospective students have adequate information about their job prospects. Institutions should also consider further reductions in enrollment.**

Does Minnesota Prepare Too Many New Teachers?

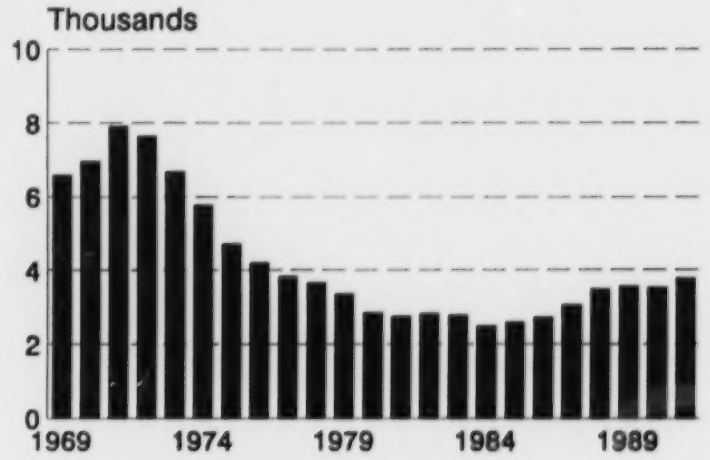
More of Minnesota's baccalaureate graduates major in teacher education than any other program area. In 1991, Minnesota institutions produced about 3,800 new teachers. As shown in Figure 3.4, this is less than half the teachers produced 20 years ago, but 38 percent more than the number produced 10 years ago.

Nine public universities have teacher education programs.

With the exception of Metropolitan State University, all of Minnesota's public universities have programs that prepare students for initial teacher licensure. The University of Minnesota's Twin Cities campus is in the process of converting its secondary teacher education programs to post-baccalaureate programs. These programs will admit students with non-teaching baccalaureate degrees and prepare them for initial teacher licensure. However, the curricula of the University's programs will look similar to those in the state's other public

Minnesota is producing 38 percent more teachers than it did 10 years ago.

Figure 3.4: Number of New Teachers Produced in Minnesota, 1969-91



Source: Minnesota College and University Placement Association.

teacher education programs, especially in elementary education.[35] The 1992 Legislature directed the State Board of Teaching to develop pilot projects for restructuring teacher preparation and licensure. These projects will examine the value of a year-long teaching internship following completion of an approved teacher education program. If the pilot projects prove effective, the board will implement the restructured licensing program statewide by the year 2000.[36]

Minnesota has a large reserve pool of potential teachers. Table 3.8 shows that there are about twice as many people with valid teaching licenses in Minnesota as there are employed teachers.[37] The number of first-time licenses that were issued in 1992 (5,991, plus 1,114 endorsements added to existing licenses) was much higher than the number of Minnesotans who left teaching positions (2,577) or the number of first-time teachers hired in Minnesota (1,660).[38]

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35 The University of Minnesota has more specialized instruction in secondary education programs. For example, the University has a unique set of courses for English teacher education, as well as education faculty who specialize in this field.

36 *Minn. Laws* (1992) Ch. 499, Art. 8, Sec. 10, Subd. 1b.

37 Most teaching licenses are valid for only five years, so it is likely that a large portion of Minnesota's reserve pool of teachers are still seeking work as teachers.

38 Minnesota Department of Education, *Teacher Supply and Demand* (St. Paul, November 1992), 20. The 2,577 people who left teaching does not include 1,400 teachers who transferred from one Minnesota school district to another. It also does not include 477 teachers who left jobs due to "staff reductions;" many of these positions will not be refilled immediately.

Table 3.8: Number of Licensed and Employed Teachers in Minnesota, October 1992

Selected Fields	Number Holding Valid Licenses	Number of First-Time Licenses Issued In FY 1991[a]	Number of Full-Time-Equivalent Teachers Employed
Elementary Education	47,795	3,097	16,774
World Languages	4,318	247	1,076
Mathematics	5,951	389	2,146
Art	2,621	129	808
Language Arts	9,506	516	2,406
Statewide Total, All Fields	101,784	7,105	51,720

Source: Minnesota Department of Education, Personnel Licensing Section.

[a]Includes original licenses and endorsements added to existing valid licenses. There were 5,991 original licenses issued statewide in FY 1992.

In elementary education, there are about three times as many licensed teachers in Minnesota as there are employed teachers. The Minnesota Department of Education projects that only about 100 new elementary teaching positions will be created annually between now and 1995, and that districts in Minnesota will actually eliminate 240 elementary positions per year between 1995 and 2000.[39] However, Minnesota's public and private teacher education programs produced nearly 2,000 elementary education graduates in 1991, and the state issued about 3,000 first-time elementary licenses in fiscal year 1992.[40] A 1990 survey of school administrators indicated that there was an average of 73 applicants for each open elementary teaching position.[41]

The number of graduates getting full-time teaching jobs dropped from 61 to 41 percent in the past 10 years.

Between 1981 and 1991, the annual number of graduates of Minnesota's public and private teacher education programs that was placed in full-time teaching positions dropped from 1,609 to 1,425. During this same period, the total number of teacher education graduates from Minnesota institutions increased by about 1,000. As a result, the proportion of Minnesota's teacher education graduates that found full-time teaching positions dropped from 61 percent in 1981 to 41 percent in 1991. We concluded that:

39 *Ibid.*, 22.

40 Minnesota College and University Placement Association, *Report on Production and Placement of New Teachers in Minnesota* (St. Paul, January 1992), 6; *Teacher Supply and Demand*, 17.

41 Office of the Legislative Auditor, *Teacher Compensation* (St. Paul, January 1991), 46. In contrast, districts had difficulty recruiting special education teachers. For example, there were only eight applications for each job opening for instructors of emotionally or behaviorally disturbed students.

- **The decline in Minnesota's teacher education placement rates resulted from an expansion of instructional programs--especially in state universities--that was larger than the job market could absorb.**

As shown in Table 3.9, state universities and private colleges accounted for all of the program growth in the past decade.

Teacher education enrollments at state universities and private colleges grew sharply in the past decade.

Table 3.9: Number of New Teachers Prepared by Various Minnesota Institutions, 1981 and 1991

	1981	1991	Percent Change 1981-91
University of Minnesota	669	603	-9.8%
Twin Cities	432	405	-6.3
Duluth	183	139	-24.0
Morris	54	59	+9.3
State University System	1,271	2,011	+58.2
Bemidji	242	239	-1.2
Mankato	261	398	+52.5
Moorhead	232	403	+73.7
St. Cloud	360	663	+84.2
Southwest	41	81	+97.6
Winona	135	227	+68.1
Private Colleges	791	1,165	+47.3
Total	2,731	3,779	+38.4%

Source: Minnesota College and University Placement Association.

We looked at the teacher education placement rates of Minnesota's public institutions and found considerable variation. Table 3.10 shows cumulative placement rates for the past three years. We found that:

- **In both the state university and University of Minnesota systems, the largest programs had placement rates at or below the state average.**

Statewide, 40 percent of the graduates of Minnesota's public teacher education programs found full-time employment. We did not find significant differences between the overall placement rates for teacher education programs in public and private colleges. Elementary teachers had somewhat more success finding employment than secondary teachers. Only about one-fourth of the public universities' teacher education graduates in physical education and social studies found jobs as full-time teachers.

Some administrators told us that teaching programs provide good preparation for many careers and should not be judged solely by the number of full-time teachers they produce. In our view, however, the placement success of teacher education programs depends on the expectations of their students. If most students have entered Minnesota's teacher education programs hoping to find

Table 3.10: Percent of Teacher Education Graduates Obtaining Full-Time Employment in Teaching Positions (1988-89 to 1990-91 Graduates)

	Bemidji State	Mankato State	Moorhead State	St. Cloud State	Southwest State	Winona State	University of Minnesota Twin Cities	University of Minnesota Duluth	University of Minnesota Morris	All Public Universities
Elementary Education	41	37	53	32	65	51	41	33	52	41
Secondary Education	43	28	38	33	45	41	34	26	49	35
All Education Programs	42	34	51	35	57	48	37	31	51	40

Note: Placement rates exclude graduates who did not respond to follow-up surveys. Southwest State's data for 1990-91 graduates were not available.

Source: Program Evaluation Division analysis of institutional placement reports.

full-time teaching jobs upon graduation, then the performance of these programs cannot be considered successful. In 1991, HECB reported that all of the state's teacher education programs make recent placement information available to students, and all but three inform students at program entry about the future job market for teachers.[42]

Most public universities have started modest reductions in teacher education enrollment.

Many of the public institutions have started modest reductions in the size of their teacher education programs. The state university board office formed a group representing all seven universities to consider enrollment reductions in teacher education programs, and each university reduced its Fall 1992 admissions by at least five percent unless an equal or greater reduction had been achieved during the previous biennium. In addition, each university is developing five-year goals and strategies for further enrollment reductions. One university, Mankato State, has agreed to reduce enrollments 20 percent over the next five years. The University of Minnesota's Twin Cities campus has been producing about 400 graduates a year for initial teacher certification, and administrators expect this number to decline by 25 to 75 graduates in coming years. On the other hand, the University's Duluth campus has lifted enrollment caps in its teacher education programs, and its enrollment is increasing.

Program Size and Cost

We compared the size of Minnesota's public teacher education programs to nationally accredited programs in other states. We limited our review to programs leading to initial licensure of teachers. We found that only two of Minnesota's programs--those at Southwest State and the University of Minnesota's

42 Higher Education Coordinating Board, *A Review of Minnesota Teacher Education Programs and the Labor Market for Teachers* (St. Paul, December 1991), 23. Students are informed about job prospects in introductory courses and through placement offices, advisors, and materials prepared for program applicants.

Morris campus--produce fewer teachers than the national median of 134 graduates.[43] Southwest State is the only public teacher education program in Minnesota that is not nationally accredited.[44]

Table 3.11 shows the cost of upper division coursework in teacher education departments at Minnesota's public universities. The 1991 cost data does not reflect some recent changes, such as faculty reductions at the University of Minnesota's Twin Cities campus and the pending merger of Duluth's two teacher education departments. We found that:

- **Southwest State's teacher education program costs about 50 percent more per student than the programs at other state universities.**

- **The teacher education programs at the University of Minnesota's Twin Cities and Duluth campuses are significantly more expensive than other programs in the state.**

If Southwest State's costs were similar to those at other state universities, the state would save $200,000 annually. The University of Minnesota's Duluth and Twin Cities programs could together save more than $250,000 for each 10 percent reduction in costs.

Table 3.11: Costs Per Student for Upper Division Instruction in Teacher Education Departments, 1991

Institution/Department	Upper Division Enrollment (FYE)	Cost Per FYE Student
Mankato State	395	$2,724
Winona State	312	2,818
Bemidji State	387	2,830
St. Cloud State	585	3,080
Moorhead State	370	3,271
Southwest State	133	4,489
University of Minnesota-Duluth	77	4,727
University of Minnesota-Morris	104	3,510
University of Minnesota-Twin Cities		
Curriculum and Instruction	265	6,145
Vocational and Technical Education	15	12,817
Music Education	42	8,310
Physical Education	69	4,726

Source: University of Minnesota and State University systems.

43 American Association of Colleges for Teacher Education, *1990-91 Directory* (Washington, D.C., 1991), 37-49.

44 Southwest State postponed application for accreditation while it weighed the costs and merits of the accreditation process, but it intends to submit an application in the near future. Institutions in some other states have recently decided not to seek re-accreditation.

We have not explored the reasons for these cost differences in detail. Table 3.11 indicates that the higher cost programs all have less than 300 FYE upper division students, so size is probably one factor in program cost. However, the higher costs might also reflect curriculum differences, such as the University's more specialized instruction of students in secondary education programs. State university system administrators noted that Southwest State's higher costs partly reflect investments it has made to improve program quality, as well as its efforts to develop close partnerships with school districts in southwestern Minnesota.

Implications

Given that the state is producing a surplus of teacher education graduates, we think the burden should be on institutions to justify high cost programs in this field. We recommend that:

- **HECB should ask Southwest State and the University's Twin Cities and Duluth campuses to (1) evaluate the potential for cost reductions in programs leading to initial teacher licensure, and (2) establish benchmarks for program efficiency and effectiveness.**

We recognize that changes in teacher education programs have widespread impacts and should be made cautiously. Eliminating teacher education programs at a university would likely reduce enrollments and increase costs per student in many other departments, perhaps threatening their viability. However, with the state's present financial climate, it will be difficult to sustain high cost teacher education programs unless they can demonstrate benefits not available at other institutions.

Institutions could reduce enrollments further, or continue trying to ensure that students have adequate information about job prospects.

We think there are two ways to deal with Minnesota's teacher surplus. First, program enrollments could be reduced--through reductions in admissions or the number of programs. The enrollment reductions that institutions have initiated in the past two years are modest and will likely reduce the state's number of teacher education graduates by about three percent. We are encouraged to see that state universities are developing plans for additional reductions over the next five years. Still, even with these reductions, we expect that students will continue to have significant problems finding full-time teaching jobs. Even if all programs operated at relatively low cost, we think it is still worth asking whether the interests of the state and students are served by continuing to prepare the projected number of graduates for a career field with relatively low employment demand.

A second strategy is for the state to continue to respond to student demand for teacher training programs but provide sufficient information on job prospects to potential students before they enroll in programs. Presently, most or all institutions provide students with information on placement rates or job prospects. We have no basis for knowing whether graduates believe, in retrospect, that this information was sufficient to make an informed decision about whether to enroll in teacher education. However, we think that institutions

should continue to review and improve the employment information they make available to prospective students.[45]

SUMMARY

The challenge for Minnesota's baccalaureate institutions during coming years will be to establish a mix of high-quality programs that: (1) respond to the needs of employers and students, (2) produce broad-minded graduates who can think critically and solve problems, and (3) are delivered in the most cost-effective manner possible.

In our view, evaluating cost-effectiveness requires policy makers to consider more than program duplication. By definition, comprehensive universities must provide instruction in a wide array of disciplines, so it is not surprising that we found considerable program overlap. However, we also found that many departments are small or expensive relative to their peers--particularly in the state university system.

We think that the higher education systems can improve program efficiency while protecting the essential missions of baccalaureate institutions. We recommend that institutions consider the following options for small or high-cost departments:

- **Eliminating selected majors or degree concentrations, while continuing to offer lower division coursework;**
- **Merging departments, both to improve efficiency and instructional effectiveness; or**
- **Forming partnerships with other baccalaureate institutions in Minnesota or reciprocity states that will allow students to pursue degrees even if the coursework is not entirely available at a single institution.**

In some cases, systems might decide that the need for student access justifies programs with high costs. In other cases, particularly the more expensive programs, systems may determine that even program restructuring will not enable institutions to offer high quality, cost-effective instruction. In these cases, institutions might consider eliminating entire departments and their courses.

Faculty contracts and tenure codes limit the ability of universities to reduce costs through layoffs. For this reason, we think it is particularly important for systems to hold programs accountable during their early years of existence. The case of Minnesota's new engineering programs illustrates that the reviews of new programs conducted by the systems and HECB have not held

45 The 1991 Legislature required HECB to publish placement reports for baccalaureate occupational programs. However, HECB does not expect to publish its first report on baccalaureate programs before 1996.

institutions adequately accountable for program performance and costs. In Chapter 4, we offer additional recommendations to address this problem and encourage more systematic review of baccalaureate programs.

Finally, we recommend that baccalaureate institutions improve consumer information as one avenue to improved accountability. The graduate followup data now collected by institutions vary considerably, and are sometimes inadequate. This information could (1) help prospective students make more informed decisions about programs to attend, and (2) provide decision makers with better information for evaluating program success. We suggest that the Legislature consider expanding its existing requirements for student followup reporting to non-occupational fields.

Program Review and Recommendations

CHAPTER 4

As illustrated by the previous two chapters, Minnesota's higher education institutions are operating many ineffective or inefficient programs. We listed examples of programs with low student/teacher ratios, high costs, or poor placement rates, especially in two-year colleges. To a lesser extent, we found that some institutions in the same geographical area were offering the same programs despite weak student or employer demand.

To ensure that institutions offer high quality programs which are responsive to student and societal needs, higher education systems must periodically review program efficiency and effectiveness. In this way, low-priority programs can be eliminated, freeing scarce resources for other programs. This chapter discusses the program review procedures of each higher education system as well as the Higher Education Coordinating Board. We focused on the following questions:

- **How do the four higher education systems review their programs? What policies, procedures, and criteria exist at the state level? Are adequate data collected and used?**
- **How many programs have been eliminated in recent years, and how many added?**
- **What are the appropriate program review roles of the Higher Education Coordinating Board (HECB), the Higher Education Board, and the respective system governing boards?**

To answer these questions, we reviewed board minutes for each higher education governing board. We collected data on the number and type of program proposals brought before each board and HECB. We also interviewed staff within system offices, reviewed system policies, and talked with some college officials about their own internal review procedures.

This chapter is divided into two sections. First, we discuss briefly how each system reviews programs and offer conclusions about the adequacy of these reviews. Second, we make recommendations concerning the appropriate review roles of the governing boards and HECB.

In general, we found that each system has developed its own approach to program review, but often this has not provided sufficient accountability. System offices and HECB have done too few program reviews that cross institutional boundaries, and they have developed too few benchmarks for measuring the effectiveness and efficiency of programs, either within or among systems. Finally, we found that HECB's review activities have had too little impact upon the efficiency and effectiveness of public higher education programs in Minnesota.

SYSTEM REVIEW PROCEDURES

Before discussing how each higher education system reviews its programs, it would be useful to consider recent program review activities of the systems' governing boards. Although each system office has its own internal administrative procedures for reviewing proposed or existing programs, the governing boards are the point of ultimate accountability. If inefficient, ineffective, or duplicative programs exist, the governing boards represent the final check. We reviewed governing board minutes from January 1987 through June 1992 to determine how often boards eliminated, approved, or modified programs. This task was complicated by the lack of (1) a consistent definition of "program" across systems, as discussed in Chapter 1, and (2) consistent practices to terminate programs. Regarding the latter, some systems have eliminated or reconfigured programs by administrative action, without board approval. This, combined with a lack of meaningful statewide program inventories, makes it difficult to know the exact number of program changes made by the systems.

Among the public higher education systems, we found that:

- **The State Board of Technical Colleges took the largest number of actions related to program review.**

During the time period studied, the technical college board eliminated (or approved institutions' requests to eliminate) 61 programs, approved 127 new ones, and instructed colleges to reduce staff in 29 others.[1] In contrast, the State Board for Community Colleges approved 9 new programs and eliminated 4, the State University Board approved 22 new undergraduate programs and eliminated 24, and the University of Minnesota's Board of Regents approved 6 new undergraduate programs.[2] The Regents also voted recently to transform the University's Crookston campus into a baccalaureate institution,

1 The board also upgraded about 100 diploma programs to include Associate in Applied Science degrees.

2 Community college data do not include Associate in Applied Science programs offered jointly with technical colleges because community colleges only provide the general education portion of these programs. Also, many of the programs which the state university system eliminated enrolled few students.

The closing of the University's Waseca campus was the most significant program change by a governing board in recent years.

replacing its 16 two-year degree programs with 12 four-year programs.[3] In 1991, the Regents voted to close the Waseca campus and all of its 19 sub-baccalaureate programs. Because this is estimated to eventually free up more than $6 million annually for reallocation, it was the single most important program change undertaken by a governing board during the time frame which we reviewed. While Regents did not formally authorize any other program eliminations since 1987, university administrators identified 20 undergraduate majors eliminated on the Twin Cities campus since 1987, plus 2 majors at Duluth and 1 at Morris.

In our opinion, the large number of actions which the technical college board took reflects: (1) the large number of occupational programs in technical colleges (1,400); (2) the need to continually adjust occupational programs in response to the marketplace; and (3) the fact that the technical college system is the only governing system that has used statewide standards to measure program effectiveness and efficiency.

The State Board of Technical Colleges was the only governing board to disapprove an institution's request for program approval since 1987.[4] The board turned down seven out of more than 100 requests for new programs from 1987 through mid-1992. Staff in all of the system offices told us that their own internal review procedures for new program proposals keep weak or inappropriate proposals from ever being presented to their respective governing boards.

Technical College System

Of the four higher education systems, we found that:

- **The technical college system was the only system that has measured its programs against formal, statewide standards of efficiency or effectiveness.**

The technical college board has used an effectiveness standard that calls for review of programs whose rates of placement in related jobs fall below 51 percent in each of three consecutive years. Although we think that the technical college system's placement standard has not been strict enough, none of the other systems have placement standards for their occupational or academic programs.

Technical colleges have had formal standards since 1983. At that time, our office issued a report on the state's technical institutes which revealed significant

3 These actions were taken in July and December 1992, just after the time frame which we reviewed.

4 For example, in 1991, the technical college board rejected a proposal to create a sustainable agriculture program at the Granite Falls campus of Southwestern Technical College. Although no other programs of this type existed in the system, the board believed that course content could be incorporated into other existing related programs.

problems with low placement, inefficient student/teacher ratios, unnecessary duplication, and high dropout rates.[5] We recommended that the institutes have average systemwide student/teacher ratios of 17:1 for non-health programs and 12:1 for health programs. Subsequently, the 1983 Legislature directed the state board to eliminate programs with placement rates below 51 percent or student/teacher ratios significantly below 17:1 for non-health and 12:1 for health programs.[6]

In 1985, the Legislature amended statutes to require simply that the state board adopt policies for minimum class sizes and placement rates.[7] Subsequently, the State Board of Technical Colleges required minimum student/teacher ratios of 10:1 for health programs and 14:1 for non-health programs. Board policy required that minimum annual placement rates not drop below 51 percent in each of two consecutive years.[8]

Five years later, the 1990 Legislature removed statutory language requiring system policies on placement rates and student/teacher ratios.[9] Subsequently, the board stopped using student/teacher ratios as a criterion for program review, for three major reasons. First, technical colleges were redesigning how programs were organized, moving toward a course-based system. The board was unsure how this would affect student/teacher ratios and did not want to unfairly penalize colleges or programs. Second, because finances were getting tighter, the board believed that colleges themselves were examining their ratios more closely and making adjustments when necessary. Third, the system office changed how it funded individual colleges by making its funding formula more sensitive to enrollment and program mix.[10]

At this time, the board also suspended its placement standard while it implemented a new student followup system. The board began using a student placement standard again in 1991.

In our opinion:

- **The technical college system has made too little progress over the past decade toward improving program efficiency and effectiveness.**

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5 Office of the Legislative Auditor, *Post-Secondary Vocational Education at Minnesota's Area Vocational-Technical Institutes* (St. Paul, February 1983).

6 *Minn. Laws* (1983), Ch. 314, Art. 5, Sec. 4, Subd. 1 and 2.

7 *Minn. Laws* (1985), Ch. 122, Sec. 4, Subd. 12.

8 The board could grant variances from the student/teacher ratio if programs served primarily special needs students, operated under lower ratios necessary for accreditation or safety, provided access, or were simply in the system's best interest. It approved placement variances when programs were adversely affected by the economy or were in the best interest of the system.

9 *Minn. Laws* (1990), Ch. 430, Sec. 1.

10 See Chapter 2 for a discussion of how technical colleges are funded.

There is considerable room for improvement in technical college programs, although the state board has recently taken some promising steps.

Our 1983 and 1985 reports on the technical college system identified many inefficient and ineffective programs.[11] We recommended that the system achieve a 17:1 student/teacher ratio for non-health programs, consistent with the system's own goals.[12] In Chapter 2, we reported that the overall student/teacher ratio had actually decreased from a high of 16.2 in 1986 to 15.9 in 1992. If these programs operated at a statewide average ratio of 17:1, we estimate that the state would have saved about $4.0 million in 1992. We think that it is especially important to reduce the number of programs with low student/teacher ratios in the Twin Cities area, where duplication is more common.

Likewise, we think that the technical college system has too many low-placement programs. This reflects the system's use of a placement standard that has not identified enough programs with low placement rates.

We are encouraged by some recent actions taken by the technical college board to try to improve program accountability. In late 1992, the board expressed concern that its placement standard may be too lenient. It directed staff to review the appropriateness of both the time frame and threshold currently used. Also, it asked staff to consider using other factors such as student/teacher ratios, cost per student, enrollment, and completion rates when reviewing programs. The board adopted revised procedures for program review in February 1993, including a stricter placement standard that will be phased in during the next year.

Also, in the last two years, the board has increased the number of regional colleges (consisting of more than one campus) from two to eight. A primary goal of these mergers was to improve program efficiency and effectiveness. In addition, the technical college chancellor has encouraged all colleges to review and "realign" existing programs.

Community College System

Unlike the technical college system, we found that:

- **The community college board has not adopted statewide standards for systematically reviewing the effectiveness or efficiency of existing programs.**

Instead, the system relies on its funding mechanism and biennial college reviews to encourage individual colleges to eliminate inefficient programs. In general, the community college board allocates funds based upon overall student/teacher ratios. Colleges receive funding at student/teacher ratios ranging

11 Office of the Legislative Auditor, *Post-Secondary Vocational Education at Minnesota's Area Vocational-Technical Institutes* (St. Paul, February 1983) and *Post-Secondary Vocational Education: Follow-Up Study* (St. Paul, March 1985).

12 As cited in our 1983 study, a November 27, 1978 memo from the Minnesota Department of Education to the Department of Finance stated that: "The schools have been advised that, with the exception of health, a reasonable and efficient goal is 17 (students) per FTE teacher." At the time of our 1983 report, Department of Education officials agreed that 17:1 was a reasonable goal.

from 21:1 to 28:1, with larger colleges receiving allocations based upon higher ratios. In addition, colleges receive supplemental funds for programs which require lower student/teacher ratios for accreditation (for example, dental hygiene or nursing) or those with special laboratory requirements.[13] System office staff told us that colleges usually do not want to continue programs that cannot sustain student/teacher ratios close to those assumed in the allocation process. Each college has a curriculum committee that reviews program offerings.

The community college system has performed biennial college reviews as part of its strategic planning process since the mid-1980s. As part of this process, the system office has examined discipline staffing ratios and graduate placement rates, and has compared individual college ratios to systemwide, large college, and small college averages. It has also reviewed staffing data prior to granting colleges permission to hire replacement or additional permanent faculty. The most recent strategic plan adopted by the community college board in September 1992 calls for a strengthened program review process at the college level to improve efficiency and effectiveness. Policies and procedures are currently being developed to implement this process.

Between 1988 and 1991, the system office provided grants to colleges that funded reviews of 95 individual disciplines, mainly in non-occupational fields. These reviews were concerned primarily with curriculum issues on individual campuses rather than efficiency issues.

In 1990, the system office reviewed all of its occupational programs and addressed questions of demand, efficiency, and effectiveness.[14] However, there were no statewide standards used to evaluate programs and compliance with recommendations was voluntary. As a result, colleges implemented few of the study's recommendations for program elimination or transfer. For example, the report recommended that community colleges with independent Associate in Applied Science programs in accounting redesign them to Associate in Science programs, which would better prepare accounting students for transfer to four-year institutions. Nevertheless, six community colleges still offer Associate in Applied Science degrees in accounting.

The community college system should adopt standards for efficiency and effectiveness.

We think that the community college system has, through its funding formula, developed some important incentives for efficiency. In Chapter 2, we noted that community colleges have higher overall student/teacher ratios for occupational programs than technical colleges. Nevertheless, we identified many programs with low student/teacher ratios or low placement rates. Although the State Board for Community Colleges has tried to leave programmatic decisions to colleges, we think that:

- **The state's fiscal problems require that the community college board adopt systemwide standards for program accountabilty.**

13 Programs which receive the low ratio funding account for six percent of full-time enrollment.

14 Minnesota Community College System, *Review and Evaluation of Career Programs Offered by the Minnesota Community College System*, (St. Paul, June 1990).

As recommended later in this chapter, we think that the board should adopt statewide policies on minimum placement rates and student/teacher ratios.

State University System

The state university board has relied on its institutions to play the lead role in reviewing existing programs. Although the system office historically has done little program review, we found that it has played a somewhat stronger role in recent years. For example, the system office has (1) encouraged institutions to eliminate most of their two-year programs in an effort to distinguish the state universities' missions from those of two-year colleges, (2) persuaded several institutions to phase out business education and office administration programs that were attracting students but were not central to the state university mission, and (3) persuaded universities to make modest reductions in admissions to teacher education programs.

State university departments undergo periodic peer reviews.

In 1988, the state university board adopted a policy requiring that each department undergo a review by someone outside the department every 5 years, plus a review by someone outside the state university system every 10 years. At the time this policy was adopted, three universities were conducting regular program reviews. Most state universities hire external consultants to conduct the five-year reviews.[15] The program reviews are supposed to assess program quality, faculty quality, program need, fiscal management, and the programs' contributions to the university and community. Institutions can use reviews of professional programs conducted by specialized accrediting organizations to meet the requirements for either 5- or 10-year reviews. However, some accrediting organizations (in engineering, for example) restrict institutions from publicly disclosing the results of accreditation reviews.

In 1991, the state university board required institutions to review programs with "zero, low, or declining enrollments" every three years and submit recommendations on these programs to the board.[16] Board policy suggests that low enrollment programs "that represent substantial costs to the institution, have been implemented for at least two years, are independent of other program offerings, or are not needed by students to satisfy state licensure requirements or other external requirements" should be recommended to the board for suspension or discontinuation.[17] However, the board's policy does not define what constitutes low enrollment.

Overall, we conclude that, despite increasing its program review activities:

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15 Some academic officials expressed concern to us that there have been instances where departments were allowed to select their own reviewers.

16 The board office has not yet received any of these reports. The Higher Education Coordinating Board issues reports every five years summarizing low enrollment programs, and its most recent report was issued in June 1992.

17 Minnesota State University System, *Chancellor's Procedures, Academic Program Policy 1-30*, (September 1991).

- **The state university system should do more to periodically compare program efficiency and effectiveness among its institutions.**

The cyclical reviews of departments are useful, particularly for highlighting deficiencies in program quality. However, reviews of individual departments should be balanced with more inter-institutional comparisons of cost, student/teacher ratios, size, placement, and other measures of program efficiency and effectiveness. In Chapter 3, we cited several examples of departments that are relatively small or have high costs. We think that the state university board office would be in the best position to periodically make these types of comparisons across institutional boundaries and establish some guidelines or benchmarks.

University of Minnesota

The University has reviewed its academic programs quite actively in recent years, prompted by tight budgets and the strategic planning effort originally known as "Commitment to Focus." In the mid-1980s, administrators and key faculty suggested that the University needed to strengthen those programs most critical to its mission and the state, while eliminating lower priority ones. To set priorities among programs, the University set forth the following criteria: (1) quality, (2) centrality of programs to the institutional mission, (3) unique characteristics that make the programs necessary at the University, (4) demand, and (5) efficiency and effectiveness.

In 1988, the University developed a five-year plan with enrollment and programmatic goals for each academic unit. The plan proposed reducing system-wide fall undergraduate enrollment from about 38,000 full-year-equivalent students to 31,600, and eliminating at least 10 percent of the Twin Cities campus' 204 baccalaureate degree programs.[18] According to the plan: "There is an advantage to designing undergraduate programs to provide broad educational background, rather than narrow specialization, except where absolutely necessary."[19]

The University's academic planning has been closely tied to its budget process.

The University has met its enrollment and program reduction goals, although administrators told us that these actions were designed primarily to improve instructional effectiveness rather than reduce costs. The University's largest college (Liberal Arts) closed some small departments and brought others under shared administration, and the Colleges of Agriculture and Human Ecology each reduced the number of existing degree programs by at least one-fourth through consolidations.

The University's academic planning has been closely tied to its budget process. The 1988 strategic plan proposed internal reallocations of $16 million over five years. In March 1991, the Board of Regents approved a proposal

18 The plan noted that 82 programs had 15 or fewer majors, and 45 had 5 or fewer. In mid-1992, University officials identified 20 majors eliminated since 1987, roughly equal to its goal.

19 University of Minnesota, Twin Cities campus, *Commitment to Focus: Academic Priorities 1988-93* (Minneapolis, February 1988), 70.

from the University administration to increase internal reallocations to $60 million (about 10 percent of its state funding) by 1996. The 1991 proposal recommended eliminating academic units and programs that did not sufficiently meet the criteria discussed above, and consolidating degree programs and course offerings. It also recommended closing the Waseca campus due to: (1) high costs per student, (2) a low percentage of students completing degrees, and (3) duplication of programs with those available at nearby institutions.

The University of Minnesota's Graduate School has been facilitating reviews of departments at the Twin Cities and Duluth campuses for about 20 years. Departments are reviewed once every eight to nine years, on average. The reviews are supposed to include both undergraduate and graduate education, but some academic administrators we talked with believe that undergraduate programs did not receive sufficient attention until recently. The Graduate School has developed a lengthy set of questions that departments are to consider as they prepare self-study reports. After the self-study, the Graduate School brings in teams of external reviewers from peer institutions, as well as reviewers from within the University. The reports resulting from this process are circulated among University administrators, but the Graduate School has not made the full reports available to the public or the Board of Regents.

In contrast to the Twin Cities and Duluth campuses, the University's Morris campus does not have cyclical program reviews, either by internal or external reviewers. The Crookston campus, as part of its proposals to change from a two-year to a baccalaureate institution, wants to establish "program improvement audit committees" in 1993. These committees would review programs and courses on a three-year cycle.

Program review is a more difficult and subjective task for the University of Minnesota.

University administrative staff regularly collect and review data on departmental costs, enrollments, and student/teacher ratios. Unlike institutions in some other states, the University does not have formal thresholds on these measures that trigger more detailed reviews. However, the University exchanges these types of data with more than 30 peer institutions in the U.S., which helps University administrators compare program size and efficiency. As described in Chapter 3, the placement data collected by the University of Minnesota's academic units are inconsistent and, for the most part, not very helpful for administrative decision making. However, the University has just completed an extensive survey of alumni that included questions about satisfaction with instructional programs.

Overall, we think that program review is a more difficult and subjective task for the University of Minnesota than for any of the other three systems. The goals of the institution are broader, and the University's desire to offer nationally-reputable programs makes program quality an even more critical issue. Our report has looked at limited measures of program efficiency and effectiveness, and we have suggested programs in Chapter 3 that should receive further review. In general, however, we think that:

- **The University has taken important steps in recent years to look at its undergraduate programs strategically and set priorities.**

The University's central administration has linked programmatic and budget decisions much more closely than the state university system. We are particularly encouraged to see that the University has proposed benchmarks by which Crookston's proposed baccalaureate programs can be judged, and later in this chapter we recommend extending this practice to other University programs.

Higher Education Coordinating Board

While the governing boards and their staff oversee program management in each of the systems, Minnesota's Higher Education Coordinating Board is responsible for higher education policy development and coordination, and it also has authority to review proposed and existing programs. State coordinating boards can play an important role in academic program review. According to two leading experts on program review:

> Evidence indicates that coordinating boards are more persistent in pressing for program terminations than governing boards. Governing boards generally do not feel comfortable telling a CEO to eliminate a program because they themselves hired that officer and feel a sense of respect for his or her judgement. This respect is one element of political influence that is difficult to measure but is nonetheless present in most reviews.[20]

HECB has had authority to review programs since 1971.

In contrast to Minnesota's higher education governing boards, HECB's role in program review has been, until recently, advisory in nature. The 1971 Legislature gave HECB authority to:

> (1) review, make recommendations and identify priorities with respect to all plans and proposals for new or additional programs of instruction or substantial changes in existing programs to be established in or offered by, the University of Minnesota, the state universities, the state junior colleges and public area vocational-technical schools; and
>
> (2) periodically review existing programs offered in or by the above institutions and recommend discontinuing or modifying any existing program, the continuation of which is judged by the commission as being unnecessary or a needless duplication of existing programs.[21]

It was not until 1987 that the Legislature specifically authorized HECB to approve or disapprove proposed new programs.[22] The 1991 Legislature further expanded the board's authority, authorizing it to "approve or disapprove

20 Robert J. Barak and Barbara E. Breier, *Successful Program Review: A Practical Guide to Evaluating Programs in Academic Settings* (Jossey-Bass: San Francisco, 1990), 110-111.

21 *Minn. Laws* (1971), Ch. 269, Sec. 1.

22 *Minn. Laws* (1987), Ch. 401, Sec. 13.

continuation or modification of existing programs."[23] Of the 28 states with coordinating boards in 1990, 22 approved both new and existing programs.[24]

HECB devotes few staff to program review.

The Higher Education Coordinating Board devotes about 2 of its 45 state-funded staff to review of new and existing public higher education programs. A 1986 external review of HECB reported that program review was a low priority activity in the organization.[25] Since 1986, the Legislature has increased HECB's program review authority considerably, giving it a stronger regulatory role. Yet, staffing levels for the program review function have not increased since then.[26] Higher Education Coordinating Board administrators told us that an increasing number of legislative mandates has kept the agency from devoting more staff to program review.

Although relatively few HECB staff review proposed or existing programs, HECB has been encouraging the higher education systems to do more of their own reviews. In its 1991 report on higher education access and needs, HECB recommended that the systems reduce duplication and conduct regular program reviews. It also recommended structural changes such as regional administrative units, the consolidation of state governing boards, a reduction in the number of campuses, and state governance of the technical college system.[27]

New Program Review

When reviewing a new program proposal, Minnesota statutes require HECB to consider whether it is: (1) unnecessary, (2) a needless duplication, (3) beyond the cabability of the system or institution considering its resources, and (4) beyond the scope of the system or institutional mission.[28]

Because HECB has only two staff reviewing public higher education programs, it relies largely on data submitted by the proposing college or system office to answer these questions. For example, to examine whether new occupational programs are unnecessary, HECB asks institutions to provide employment and student interest data, and to consult with employers or professional organizations. For proposals for non-occupational programs, it asks institutions to document how proposed programs meet societal requirements and expectations.

The board examines needless duplication by requiring institutions to define the geographic service area and the prospective student market for proposed

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23 *Minn. Laws* (1991), Ch. 356. Art. 2, Sec. 4.

24 Education Commission of the States, *Postsecondary Education Handbook* (Denver, 1991), 7.

25 M & H Group, Inc., *An Agency Performance Audit: Report to the Minnesota Higher Education Coordinating Board* (Boulder, Colorado, September 1986).

26 The Higher Education Coordinating Board has two additional staff who review private higher education programs.

27 Minnesota Higher Education Coordinating Board, *M SPAN 2000: Minnesota Study of Post-Secondary Access and Needs, Summary, Conclusions, and Recommendations* (St. Paul, March 1991.)

28 *Minn. Stat.* §136A.04, Subd. 1(4).

programs. Also, it requires institutions to consult with neighboring institutions offering similar programs. Officials with some of the higher education systems told us that institutions have sometimes portrayed duplicative programs to HECB as serving unique missions. They also noted that, historically, some institutions found ways to offer programs without going through the formal HECB review process.

The Higher Education Coordinating Board requires institutions to document the resources available or needed to offer the proposed program at full operation. If sufficient resources are not available, institutions must submit plans for the necessary funds. Also, since 1991, the board has required institutions to submit plans for internal program evaluation.

The Higher Education Coordinating Board's Program Advisory Committee (PAC), which includes representatives from the four public higher education systems and from private institutions, reviews all new program proposals. After receiving staff evaluations, the committee decides whether to send proposals to the full board after one review (the "short track") or a longer review (the "regular track"). The board receives recommendations from both staff and the advisory committee. According to HECB, depending upon the completeness of documentation and supporting data provided by the institution and the level of debate the proposal generates, the normal time from initial application to board action is about two months for short track programs and three for regular track ones.[29]

The data in Table 4.1 show the number of new program proposals sent to HECB since 1981. As shown, we found that:

- **Over the past 12 years, HECB approved nearly all requests for new programs, and rejected none.**

Table 4.1: HECB Actions on New Program Proposals, Fiscal Years 1981 through 1992

System	Approved	Approved With Conditions	Withdrawn	Total
Technical College	200	3	10	213
Community College	22	6	3	31
State University	51	0	4	55
University of Minnesota	23	3	8	34
Total	296	12	25	333

Note: New proposals include technical college requests to upgrade existing programs to include Associate in Applied Science degrees. We counted proposals for joint Associate in Applied Science degrees only for the institution offering the technical courses for the degree.

Source: Higher Education Coordinating Board.

29 Minnesota Higher Education Coordinating Board, *Policy on Program Review/Approval and Approval of Off-Campus Locations* (St. Paul, May 1990), 3.

Systems withdrew eight percent of their proposals for new programs.

Since 1981, HECB approved 92 percent of the proposals submitted by the state's public higher education systems. It rejected none, although systems withdrew eight percent from board consideration. According to HECB, systems have usually withdrawn proposals when staff reviews were unfavorable. For example, the University of Minnesota withdrew its 1991 proposal for an electrical engineering program at its Duluth campus because HECB staff indicated that it would duplicate other programs. Likewise, the state university system withdrew its 1991 proposal for an engineering physics program at Bemidji because HECB staff expressed concerns about adding engineering programs at a sixth Minnesota university.

We think that HECB sometimes has an impact on program proposals that is hard to detect. Institutions might refrain from proposing new programs or submit better proposals because of HECB's review requirements. HECB has developed standards for associate degrees and guidelines for program approval, and each system considers these criteria as it reviews proposed programs. However, most system officials that we talked with said that HECB reviews were another hurdle in the process of getting programs approved, but had very little final impact on program offerings. Some said that HECB lacked the staff to verify information submitted by institutions, while others said that HECB had not shown boldness or leadership in its program review activities.

Existing Program Review

Most of Minnesota's public higher education institutions and programs predate HECB, which was established in 1967. Consequently, most higher education programs have never gone through HECB's approval process. The Higher Education Coordinating Board has had the authority to review existing programs for more than 20 years, although it only received authority to approve or disapprove existing programs in 1991. We found that:

- **The Higher Education Coordinating Board has not used its authority to review existing programs effectively, and did not develop a reliable inventory of existing programs before 1992.**

The Higher Education Coordinating Board has had program inventories since the early 1970s. However, partly because the board did not define "program" until recently, its inventories have not provided consistent, reliable information on program offerings. Also, the systems have not routinely reported program changes to HECB, so its inventories have been out of date. To varying degrees, the systems have not maintained accurate inventories of the programs offered by their campuses.[30] We think that an accurate program inventory is a critical first step to effective program review, and the lack of such an inventory has impaired HECB's oversight activities. Although the systems share in the blame for the lack of a reliable inventory, we think HECB should have provided them with more guidance.

30 As of early 1993, the technical college system had not effectively verified with campuses its own central inventory of programs.

Over the past decade, HECB has conducted a limited number of reviews of existing programs, sometimes in response to proposals for new programs. Among baccalaureate and sub-baccalaureate programs, HECB examined teacher education, engineering, dental hygiene, and nursing programs. In addition, it has issued three reports on programs with low or no graduates.[31] However, despite the Legislature's long-standing concerns about duplication and efficiency among occupational programs in two-year colleges, HECB has done little analysis of them.

In addition, HECB has done little followup on new programs to determine whether they have achieved their goals. We reviewed all baccalaureate programs which HECB approved between 1985 and 1987 and found that:

- **Many new programs have not performed as well as projected at the time HECB approved them.**

Table 4.2 compares the number of graduates from the new programs in four-year institutions with the number originally projected. As shown, about three-fourths of the new programs graduated far fewer students than proposed. For example, by 1992, the state's four new engineering programs graduated only a quarter of the students originally projected.

New programs should be subject to followup reviews.

The poor performance of these programs suggests a need for additional followup by HECB or the governing boards. Wisconsin's governing board for its university system reviews all programs five years after their initial approval. Minnesota's technical college system follows a similar procedure for "new venture" or "quick start" programs. Under state law, these proposals are not sent immediately to HECB after approval by the governing board.[32] Rather, the programs operate for a set length of time (twice the program's length), after which they must be approved by the technical college board again and then by HECB. In this way, technical colleges can respond quickly to economic conditions and still provide a performance check. Later in this chapter, we recommend that HECB approve new programs on a probationary basis and conduct subsequent followup on their performance.

In response to its more recent authority over existing programs, HECB has adopted the following five-step procedure:

1. Review system compliance with the 1991 statutory mission statements.

2. Establish an inventory of approved programs.

3. Develop an inventory of system policies and procedures regarding their review of existing programs.

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31 Some of the system offices have criticized these reports because they listed nonexistent programs, reflecting HECB's outdated inventory.

32 *Minn. Stat.* §136C.04, Subd. 11.

Table 4.2: Comparison of Projected to Actual Number of Graduates for Baccalaureate Programs Approved by HECB, Fiscal Years 1985-87

Program	Institution	Number of Graduates Originally Projected	Actual Number of Graduates 1988-89	1989-90	1990-91	1991-92
Materials Science Engineering	University of Minnesota-Twin Cities	30	19	10	12	9
Computer Information Science	Moorhead State	50	17	10	13	20
Computer Studies	Southwest State	20	11	10	10	12
Computer Science	University of Minnesota-Morris	20	5	10	9	13
Materials Engineering	University of Minnesota-Duluth	50	0	6	8	11
Industrial Engineering	University of Minnesota-Duluth	90-100	0	19	31	24
Speech/Hearing Science	University of Minnesota-Twin Cities	35	24	21	26	30
Biotechnology	Mankato State	30	0	3	5	7
Energy Management	Moorhead State	30	5	6	6	3
Finance	Winona State	20	12	24	29	29
Music Industry	Moorhead State	15	4	11	6	8
Astronomy	University of Minnesota-Twin Cities	3	0	0	1	0
Pictorial Illustration	Moorhead State	6-10	0	3	3	0
Mechanical Engineering	Mankato State	60	5	4	10	16
Cytotechnology	Moorhead State	5	0	0	0	1
Aviation	St. Cloud State	40	15	20	21	39
Women's Studies	University of Minnesota-Duluth	10	2	4	4	4
Human Resources Management	Winona State	25	8	13	14	21
Marketing	Winona State	100	66	58	64	61
Cytotechnology	Winona State	12	0	1	1	1
Management Information Systems	Winona State	50	2	3	7	11
		701-715	195	236	280	320

Sources: Program proposals submitted to HECB; State University System and University of Minnesota institutional research offices; and state university institutional research staff.

4. Review annually all systems' reports regarding their own management and program review processes, and conduct cyclical program reviews as needed.

5. Continue to issue periodic studies.[33]

Most of these activities are ones that HECB has performed previously, although sometimes not effectively. For example, HECB has participated in mission delineation discussions for years, maintained a program inventory, and done ad hoc studies periodically. The most significant new function proposed by HECB is the annual review of existing programs. The Higher Education Coordinating Board has asked each system to describe how it now reviews existing programs, and HECB will then determine whether system review

33 Thus far, HECB has completed the first two steps, and has requested copies of the higher education systems' formal review procedures.

procedures are adequate. If so, it will collect information from the systems to produce an annual report on existing programs. If review processes are deemed inadequate, HECB staff indicated to us that they will conduct their own periodic reviews of programs.

HECB should reconsider its policy for reviewing existing programs.

We have several concerns about HECB's policy for reviewing existing programs. First, it does not outline the components of an "adequate" program review or provide general guidelines for the higher education systems to use. In Chapter 1, we noted that Illinois' Board of Higher Education has developed a useful set of guidelines for reviewing programs, some of which were shown in Figure 1.5. Second, the policy commits HECB's limited public program review staff (currently two) to an annual report on hundreds of programs. While we commend the board for its ambition, it might be wiser and more realistic for staff to focus their attention more strategically--perhaps targeting selected program areas each year or evaluating whether the systems are achieving broad goals, such as a systemwide student/teacher ratio for technical colleges. Third, HECB's policy does not indicate what specific criteria it might use to terminate existing programs. Although HECB staff told us that they would use the criteria contained in state law (necessity, duplication, adequacy of resources, and consistency with mission), these criteria are vague. Finally, officials at some institutions expressed concern to us about sharing program reviews with HECB because some of these documents are considered confidential reports to management. However, academic officials told us that they would be willing to cooperate if HECB would specify particular information or judgments that should appear in the reports that it receives.[34]

Overall, we conclude that:

- **The Higher Education Coordinating Board's policy for reviewing existing programs is unfocused and provides too little guidance to the state's four higher education systems.**

CONCLUSIONS AND RECOMMENDATIONS

We found that each of the higher education systems has scrutinized its instructional programs more closely in recent years. To a large extent, this reflects increasing state budget constraints. It also reflects management initiatives such as the technical college system's creation of regional colleges, the community college system's student success program, the state university system's development of quality indicators, and the University of Minnesota's strategic plan (formerly called Commitment to Focus).

Despite these efforts, there continue to be instances of unnecessary duplication, inefficiency, and ineffectiveness among Minnesota's wide array of public higher education programs. It is difficult to precisely estimate the extent of

34 Also, HECB may encounter problems getting copies of program accreditation reviews because some accrediting organizations do not release them publicly.

these problems because there are few widely-accepted standards for determining reasonable student commuting distances and appropriate student/teacher ratios, placement rates, enrollments, and other performance measures. Nevertheless, we found considerable differences in program costs and outcomes, more than seemed reasonable. High costs may, in some cases, represent the price the state must pay for providing greater access to higher education; in other cases, they may reflect inefficiency.

Comparisons of program efficiency and effectiveness among institutions are too infrequent.

Although institutions often conduct reviews of their own programs, we believe that there is too little comparison of program efficiency and effectiveness *among* institutions and systems. Only one of the four public governing boards has adopted a standard for evaluating program efficiency or effectiveness, and this single standard for graduate placement rates is, in our judgment, too lenient. Particularly in the case of two-year colleges, as discussed in Chapter 2, we think that applying reasonable system standards for effectiveness and efficiency could potentially save several million dollars annually, or make this funding available for reallocation.

Program review is a necessary activity for institutions, system governing boards, and the Higher Education Coordinating Board. However, the types of review done by these entities should differ. In Figure 4.1, we suggest various levels of program review that could be conducted. We think that colleges and system offices should continue to do most of the program review activity, but ultimate accountability should rest with the governing boards and HECB.

In 1995, the governing boards for the state university, community college, and technical college systems will be replaced by a single board, the Higher Education Board (HEB). This will reduce the number of public governing boards in Minnesota from four to two. The Legislature created HEB, in part, to encourage more program review among the three systems it will govern. As HEB assumes this program review role, we think the role of HECB should change accordingly. We think there will be less need for HECB to review program duplication, efficiency, and effectiveness among the programs at two-year colleges because these programs will be subject to review by a single governing board. To the extent possible, HEB should establish common standards for evaluating occupational programs at two-year colleges. This will enable HECB to focus more attention on program comparisons between the state university and University of Minnesota systems, which will continue to operate under separate governing boards.

We envision a system of program review in which: (1) HECB sets general *program review guidelines* for all four higher education systems and outlines the types of performance standards it expects systems to have, (2) the systems adopt *performance standards* for evaluating individual programs, and (3) the systems regularly *monitor* the performance of all their programs, while HECB periodically evaluates programs in selected fields. To help fulfill these roles, we recommend that:

Figure 4.1: Types of Program Review Appropriate for Institutions, Systems, and the Higher Education Coordinating Board

REVIEWS BY INSTITUTIONS

- Reviewing and justifying programs that fail to meet governing board systemwide standards (e.g., standards for enrollment, placement, student/teacher ratios, or cost) or stricter standards established by the institution.
- Developing benchmarks against which to measure the future performance of programs that are unique or that have low performance on certain measures.
- Conducting cyclical reviews of individual programs, departments or disciplines (by officials at the institution or peers outside the institution).
- Coordinating accreditation reviews (where appropriate).

REVIEWS BY GOVERNING BOARDS OR SYSTEM OFFICES

- Establishing and maintaining a systemwide database on enrollment, cost, placement, staffing, and other measures of performance deemed appropriate.
- Developing performance standards for programs and asking institutions to justify programs that fail to meet these standards.
- Comparing similar programs across institutions on performance measures.
- Establishing budget allocation processes that reward high quality, high-priority programs and provide incentives for efficiency.
- Considering ways to make better use of existing system capacity, or encouraging students to use less expensive instructional programs.[1]
- Delineating missions among various types of institutions, especially in two-year occupational programs (Higher Education Board).
- Collecting and reviewing institutions' cyclical program reviews.
- Establishing a systemwide database indicating "accreditable" programs and the accreditation status of each.

REVIEWS BY HIGHER EDUCATION COORDINATING BOARD

- Developing general guidelines to help systems evaluate the performance of higher education programs and to guide HECB in decisions to "disapprove" existing programs.
- Approving and disapproving new programs (probationary and final approvals).
- Conducting strategic reviews of multiple programs in selected fields, and analyzing fields in which the state has a surplus or shortage of graduates.
- Working with systems to develop general performance benchmarks (such as systemwide student/teacher ratios), and monitoring progress toward these benchmarks.
- Maintaining an up to date program inventory.
- Ensuring that governing boards have reasonable approaches to program review.
- Publishing consumer information (e.g., placement data and the program inventory).

[1] This is particularly applicable to the Higher Education Board, which will be responsible for curricula, such as lower division accounting, that are offered in all three of its systems.

- **In 1993, the Higher Education Coordinating Board should develop guidelines to help the higher education systems evaluate the performance of their programs.**

We suggest guidelines similar to those developed by Illinois' Board of Higher Education, as shown in Figure 1.5. Minnesota's Higher Education Coordinating Board should also use the guidelines to determine when to "disapprove" existing programs, as allowed by state law.

We also recommend that:

- **The governing boards or system offices should adopt standards for evaluating the efficiency and effectiveness of programs or departments. The system offices of the technical college, community college, and state university systems (and eventually the Higher Education Board) should periodically compare program performance *among* institutions. The Higher Education Board should begin developing program review standards that will take effect in 1995.**

Governing boards should adopt program standards.

As noted earlier, there is no widespread agreement on what exact standards to use. Standards could be used to identify programs with low performance on measures such as enrollment, placement rates, student/teacher ratios, cost per student, or combinations of these and other measures. The standards could be based on peer comparisons or system goals. Some measures, such as placement rates for occupational programs, should be reviewed annually, while others might be reviewed less frequently. In the case of student/teacher ratios, standards should differ by program type, with higher minimum ratios for fields that primarily have lecture courses. System offices should ask institutions to justify programs failing to meet the standards, and could then eliminate, restructure, or further examine these programs. In the case of programs that are unique in certain ways or not easily compared with peers, system offices could ask institutions to establish benchmarks for evaluating the programs' future performance. The University of Minnesota has proposed such benchmarks for its Crookston campus, and should consider developing them for other academic programs as part of its 1993 strategic plan.

The use of system standards should not preclude institutions from operating under higher ones. For example, we found that some technical colleges already do considerable program review, especially when preparing their spending plans. Some have developed their own criteria for reviewing programs. For example, Hennepin Technical College's internal review process, established in late 1991, targets programs which are (a) below the statewide average student/teacher ratio, (b) graduating less than 51 percent of enrollees, (c) placing less than 75 percent of graduates in related jobs, or (d) in fields where the number of graduates is greater than the number of projected job openings.

The governing boards should review how they allocate funds and try to incorporate incentives for program efficiency. However, we do not think the systems should rely solely on funding incentives to encourage better program performance. System offices should still periodically measure program performance against governing board standards.

To improve HECB oversight of programs, we recommend that:

- **The Higher Education Coordinating Board should approve new programs on a probationary basis and review the programs for**

final approval three to five years later, depending on program length.

- **In addition to granting probationary and final approvals, HECB's program reviews should consist primarily of (1) strategic, targeted reviews of multiple programs in selected fields, and (2) analyses of fields in which the state has a surplus or shortage of graduates. The Higher Education Coordinating Board should ensure that the systems establish reasonable program review standards.**

- **To ensure a more accurate program inventory, HECB should ask each system to provide a comprehensive annual update of programs offered as well as those eliminated during the previous year. Likewise, each of the systems should annually ensure that it has an accurate inventory of programs offered by its institutions.**

We think that improved consumer information on higher education programs can provide incentives for more program accountability. Toward this end, the Legislature's 1991 requirement of a statewide followup system on graduates of occupational programs was an important first step.[35] We recommend that:

- **The Legislature should consider extending its requirements for a post-secondary graduate followup system to *all* baccalaureate programs, to be coordinated by HECB.**

To minimize the costs of such a system, we recommend that statewide followup surveys for non-occupational fields be done less frequently than those for occupational fields--perhaps once every five years. The Legislature or systems could also consider requiring institutions to publish placement rates for occupational or other programs in their bulletins or course catalogs. In addition, we think that students and administrators should have information on the wages that graduates of occupational programs receive. We recommend that:

- **As part of the graduate followup reporting system, HECB should collect wage data every three to five years for occupational fields.**

- **In selected occupational fields, HECB or the systems should periodically consider longer-term followups of graduates to determine their job advancement, need for additional education, and satisfaction with occupational training.**

In Chapter 2, we noted that technical and community colleges offer similar programs in some occupational fields, but there are differences in the transferability of credits to baccalaureate institutions. To better inform students about differences between these programs, we recommend that:

- **The technical college system office should work with colleges to ensure that all students receive program-specific information**

35 *Minn. Laws* (1991), Ch. 356, Art. 1, Sec. 2, Subd. 2.

concerning the transfer of technical college credits to baccalaureate institutions.

We found that the Legislature's decision to add engineering programs at several institutions in recent years was an expensive one. Cost should be one of many considerations in future decisions about these programs, and we recommend that:

- **The Legislature should ask HECB to prepare a report for the 1995 legislative session on the merits of consolidating engineering programs, including a cost analysis.**

We also recommend that:

- **The technical college board should measure placement rates using HECB's proposed method. The community college board should adopt similar measures for occupational programs, and should adopt placement standards.**

- **The technical and community college boards (and eventually the Higher Education Board) should consider more stringent standards for student/teacher ratios and placement in programs that duplicate others nearby.**

- **The technical college system should revise its state aid allocation formula by setting a minimum funding ratio higher than 10 students per faculty for instructional programs.**

- **The Higher Education Board should develop uniform data collection systems and program review policies for the technical college, community college, and state university systems. The state university and University of Minnesota systems should, to the extent possible, develop common methods for analyzing departmental costs and student/teacher ratios by level of instruction (upper division, lower division, and graduate).**

- **The Higher Education Coordinating Board should periodically ask systems to justify the continued existence of individual baccalaureate programs with an annual average of 10 or fewer graduates.**

- **The state university system should require Metropolitan State University to maintain discipline-based enrollment and cost data that will enable better program review.**

- **The University of Minnesota should require periodic reviews of programs at its Morris campus.**

- **The state university and University of Minnesota systems should require that external program reviews explicitly consider whether departments are offering an appropriate number of options and specialized courses within degree programs.**

- **The Higher Education Coordinating Board should ask institutions with high-cost teacher education programs to (1) evaluate the potential for cost reductions, and (2) set benchmarks for future program efficiency and effectiveness.**

Finally, there are some important types of instructional duplication that were beyond the scope of this study. For example, although there is little duplication of degree *programs* at some nearby technical and community colleges, there appears to be course-level duplication. While some of this duplication might be justified by high student demand, we recommend that:

- **The Higher Education Board should evaluate unnecessary duplication among courses at nearby institutions, and streamline course offerings as appropriate.**

Student/Teacher Ratios at Public Baccalaureate Institutions

APPENDIX A

Chapter 3 reports data on costs per student in selected disciplines at baccalaureate institutions. One of the primary determinants of costs is staffing ratios. This appendix reports student/teacher ratios for reference purposes, but they are subject to some important limitations.

First, the higher education systems' faculty staffing data do not distinguish graduate from undergraduate instruction, so the computed student/teacher ratios include students and faculty from both levels of instruction. It is not unusual for graduate programs to operate with smaller student/teacher ratios than undergraduate programs, so the table below highlights departments that had significant amounts of graduate instruction.

Second, we used somewhat different approaches to define full-time-equivalent (FTE) faculty in the state university and University of Minnesota systems. The state universities' faculty contract specifies that a faculty member can teach up to 36 undergraduate credits per academic year, so we used this workload standard to calculate FTE faculty.[1] The University of Minnesota does not have a master faculty contract that specifies workload in terms of credits taught. Rather, faculty have appointments for specified times (such as 12 or 9 months). We assumed that a 9-month appointment was 1.0 FTE.[2]

Third, the University of Minnesota--particularly the Twin Cities campus--has a broader mission than the state universities. Both systems provide undergraduate instruction, but the University provides more research and public service activities. As a result, the University's average faculty member devotes less time to classroom instruction (9.6 hours per week at the Twin Cities campus) than does an average state university faculty member (11 hours per week systemwide), according to studies recently done by the systems for HECB.

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1 We assumed that 1.0 FTE taught 36 credits during the academic year, although most instructors actually teach fewer credits. A recent study by the state university board office indicated that faculty members taught, on average, 11 credits in Fall 1991. Also, the contract sets the graduate-level faculty load at 27 credits, but we used the 36-credit undergraduate load to compute FTE because the state university system's data do not distinguish graduate from undergraduate teaching credits.

2 Three institutions (Mankato State University and the University of Minnesota's Twin Cities and Duluth campuses) make considerable use of graduate assistants for instruction, while the other campuses do not. We obtained information from Mankato State on the teaching loads of graduate assistants and included these in the student/teacher ratios; we did not treat courses taught by graduate assistants differently from other courses. For the University of Minnesota, the full-time-equivalent of its graduate assistants was determined by dividing each department's total student teacher salaries by that department's average salary for full-time student teachers.

Fourth, the faculty FTE data were based on budgets developed at the beginning of the academic year, and usually do not reflect staffing changes during the year.

Finally, differences in staffing may reflect differences in curriculum and instructional approach, not just differences in efficiency. For example, there is wide variation in student/teacher ratios among the state universities' biology departments. To a large extent, this reflects whether institutions have laboratory requirements for introductory courses.

Table A.1: 1990-91 Student/Teacher Ratios in Selected Public University Disciplines

	State Universities		University of Minnesota	
	Low	High	Twin Cities	Duluth
LIBERAL ARTS				
Anthropology/Sociology	29.4	38.0	26.5	48.9
Economics	20.0	28.3	37.4	26.6
History	23.4	34.0	22.2	29.1
Political Science	22.4	36.6	23.0	21.4
Psychology	27.1	36.8	26.4	33.7
Art	15.5	26.5	19.6	25.7
Music	11.9	17.5	11.9[a]	24.3
Philosophy	23.6	36.6	25.5	24.3
Geography	27.5	32.6	24.4	30.0
French, German, Spanish	8.9	22.4	20.4	15.5
English	18.4	27.0	19.7	26.1
Speech/Theatre	14.1	27.9	17.0	20.7[b]
Mass Communication	15.2	35.4	24.7	29.8
Social Work	17.0	28.0	17.0[a]	12.1[a]
SCIENCE AND ENGINEERING				
Mathematics	19.1	26.9	17.4	31.7
Physics	15.2	27.2	12.4[a]	19.6
Geology	23.4	38.6	10.7[a]	11.2
Chemistry	21.0	28.9	9.3[a]	17.5
Biology	16.7	33.3	12.2[a]	16.5
Computer Science	16.8	24.0	13.0[a]	18.0
Engineering	6.2	10.8[c]	10.1[a]	9.1
BUSINESS				
Accounting	18.9	26.2	23.0[a]	32.8
Business	21.9	32.7	17.3[a]	22.8
EDUCATION				
Teacher Education	16.7	22.7	15.2[a]	16.5
Physical Education	17.7	26.2	12.8[a]	26.8

Note: The University's central administration calculates student/teacher ratios for its Morris campus by department. The ratios for these broad departments were: Humanities-16.8, Education-22.9, Science and Math-21.1, and Social Science-25.3.

Source: Program Evaluation Division analysis of faculty and enrollment data supplied by higher education systems.

[a]More than 15 percent of discipline's FYE students are in graduate-level courses.

[b]Theatre only.

[c]Includes engineering technology.

Costs Per Student For Lower Division Instruction

APPENDIX B

Courses directed at college freshmen and sophomores, or students in two-year colleges, are usually referred to as "lower division" instruction. The following table shows the fiscal year 1991 direct instructional costs costs of lower division coursework in selected disciplines in the community college, state university, and University of Minnesota systems.

Table B.1: 1990-91 Lower Division Costs Per Student at Public Universities

	Costs Per Student For Lower Division Instruction			
	Community College System Average	State University System Average	University of Minnesota Twin Cities	University of Minnesota Duluth
Biology	$1,888	$2,294	$5,550	$2,912
Mass Communication/ Journalism	3,836	2,282	3,560	2,931
Computer Science	3,567	2,854	--	3,107
Health/Physical Education/ Recreation	1,732	2,564	8,436	2,615
Art	2,260	3,319	3,475[a]	2,501
Music	2,449	3,595	5,531	3,312
Theatre	1,795	1,577	2,760	3,762
Speech	1,681	2,304	1,395	--
German, French, Spanish	2,301	3,136	1,896	3,680
English	1,990	2,409	2,206	--
Philosophy/Humanities	1,456	1,899	1,973	2,329
Math	1,732	2,230	2,691	2,157
Physics	3,011	2,784	4,409	3,361
Chemistry	2,489	2,620	7,872	3,631
Psychology	1,224	1,257	2,415	1,514
Anthropology/Sociology	1,300	1,731	1,711	1,226
Economics	1,303	1,738	2,643	3,116
History	1,515	1,811	2,446	2,123
Geography	1,490	1,475	2,819	2,088
Political Science	1,549	1,569	2,419	2,685
Accounting	1,812	2,290	3,780	3,034
Business/Marketing/ Management	1,703	2,196	4,817	3,193

Source: Program Evaluation Division analysis of cost and enrollment data supplied by higher education systems. Direct instructional costs only.

[a]Includes studio art and art history.

The community college costs are the most accurate in this table, because they reflect all of this system's instructional expenditures in these disciplines. In contrast, the state university and University of Minnesota systems *estimate* the portion of departmental costs that are represented by lower division, upper division, and graduate level courses, and these estimates are based on assumptions rather than course-level cost data. For example, the University of Minnesota allocates costs to courses based on the *average* salary of professors in a department. If lower division courses were taught mainly by instructors with below-average salaries, the University's estimates of its lower division costs would be overstated.

It is also important to note the faculty workload differences between the three systems shown in this table. According to estimates developed by each of the systems, community college faculty teach an average of 15.8 hours per week, state university faculty teach 11 hours, and the University's Twin Cities campus faculty teach 9.6 hours. Faculty in the university systems are expected to conduct more research and public service activities than faculty in the community colleges. Thus, higher costs in these systems may, to some extent, reflect the broader missions of these systems.

There are other factors that affect the costs shown in this table. The University of Minnesota has higher average faculty salaries than the other two systems. In addition, there may be qualitative differences in the instruction provided in these three systems. For example, many of the University's programs have national reputations and national accreditation.

Student/Teacher Ratios at the University of Minnesota and Peer Institutions

APPENDIX C

In Appendix A, we noted that it is difficult to make direct comparisons between staffing at the University of Minnesota and state universities because of the differences in institutional missions. Because there are no Minnesota institutions whose missions are comparable in scope to the University of Minnesota's Twin Cities campus, this appendix presents staffing comparisons between this campus and other American research universities.

These research insitutions participate in a voluntary data exchange and collect relatively comparable data on staffing. Sixteen universities (plus the University of Minnesota) reported student/teacher ratios for Fall Quarter 1988, summarized in the table below. The table reports those disciplines for which at least six University peers reported data. It excludes disciplines in which graduate credits accounted for more than 15 percent of the total credits taught by either the University or the peer institutions.

Table C.1: Comparison of Student/Teacher Ratios at the University of Minnesota-Twin Cities and Peer Institutions

Department	Full-Year-Equivalent Students Per FTE Faculty: University of Minnesota Twin Cities Campus	Median of Peer Institutions	Number of Peers
African and Afro-American Studies	12.98	11.79	9
Anthropology	30.40	15.45	15
Art History	28.38	18.12	6
Astronomy	18.16	21.80	10
Botany	6.05	9.34	8
Chemistry	9.30	12.30	16
Classical and Near Eastern Studies	20.89	23.15	13
Earth Science/Geology	10.68	9.38	13
East Asian Studies	23.92	10.95	7
Economics	37.38	23.57	15
English Literature and Composition	19.72	14.00	16
Design/Housing/Apparel	26.21	14.18	7
French/Italian	19.53	13.09	13
Geography	24.43	21.03	12
German	16.02	11.51	13
History	22.20	20.45	16
Journalism	24.65	11.96	13
Mathematics	17.37	19.54	16
Philosophy	25.45	16.78	16
Physics	12.44	10.46	16
Political Science	23.02	19.95	16
Psychology	26.44	19.77	16
Russian and Slavic	18.90	8.86	11
Sociology	24.63	21.70	16
Spanish/Portuguese	24.52	15.22	10
Speech/Communication	17.74	18.30	9
Studio Arts	15.55	11.83	14
Theatre Arts	16.26	9.66	14

Source: Program Evaluation Division analysis of data from the Association of American Universities, supplied by University of Minnesota. Peer institution data are for Fall 1987, and University of Minnesota data are for the 1990-91 academic year.

Minnesota Technical College System

State Board of Technical Colleges
Capitol Square Building 550 Cedar Street St. Paul, MN 55101

February 17, 1993

James Nobles, Legislative Auditor
First Floor, Centennial Office Building
658 Cedar Street
St. Paul, MN 55155

Dear Mr. Nobles:

We have reviewed the legislative auditor's report on program duplication within higher education. We found the research methodology, findings, and recommendations to be fair, especially considering the complexity of the four systems and the distinctions in missions.

Generally, we concur with the recommendations in the report. Accountability is not a new concept but has been highlighted with the current fiscal condition of the state and of each system. All of higher education will benefit from clearly defined outcomes and program review processes.

We appreciate the acknowledgment and reinforcement of our system's efforts in establishing and implementing standards of effectiveness and efficiency. With a mission focused on education for employment, our Board has, for many years, measured placement rates and has held programs accountable for a minimum rate of 51%. Over the last two years, the Board has reviewed all of its policies and procedures. Included in this process was an evaluation of current program standards. This review resulted in adoption of more stringent standards at their February meeting.

- Effective in the 1992-93 year, the standard for placement will be a minimum 51% rate for two consecutive years.
- Effective July 1, 1993, the standard increases to a minimum of 60% for two consecutive years.
- Effective, July 1, 1993, additional measures will be used to assess program effectiveness and efficiency. This review has a strong focus on local college decisions with an appropriate level of system level oversight.

We also concur that program duplication in itself is not a harmful occurrence. Duplication does need review, though, in relation to occupational demand, and resources used to maintain and enhance the quality of instruction. Our new regional college structure will further enable campuses within a region to align their instructional offerings to maximize student opportunities and effective use of all resources.

We want to thank you and your staff for the openness and responsiveness shown during this process.

Sincerely,

Carole M. Johnson

Carole M. Johnson
Chancellor

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An Equal Opportunity EDUCATOR and EMPLOYER

Minnesota
Community Colleges

Office of the Chancellor
203 Capitol Square Building
550 Cedar Street
St. Paul, Minnesota 55101-4798
(612) 296-3990

February 17, 1993

Mr. James Nobles
Legislative Auditor
Centennial Office Building
St. Paul, MN 55155

Dear Mr. Nobles:

The report does a good job of treating a very complicated and difficult topic. It provides some thoughtful recommendations for further action. We appreciate the good working relationship that we have had with your staff on this project.

We urge readers to keep the following points in mind:

1. The analysis of program efficiency uses discipline staffing ratios for the Minnesota Community Colleges. Community College associate degrees in occupational programs require students to take from one-third to three-quarters of their credits in disciplines other than the occupational program. These credits are typically taken in disciplines related to the program or in liberal arts disciplines. Community College program staffing ratios which included all coursework that students take would be higher than discipline ratios because of the higher ratios in the liberal arts disciplines.

2. The analysis of discipline staffing ratios notes the strong relationship between college size and those ratios. The large colleges tend to have much higher ratios than the small colleges. This relationship is the result of the System Allocation Policy that takes advantage of the economies of scale. That is, large colleges, by virtue of their size, can operate more efficiently than small colleges. The more efficient large colleges receive allocations at higher ratios in order to allow the less efficient small colleges receive allocations at lower ratios.

3. The analysis of program duplication treats an associate of applied science degree program in a field as a duplication of a diploma program in the same field. Diploma and associate degree programs are significantly different both in design and intended employment. The associate degree programs provide a broad background in the liberal arts. This background affords graduates more employment options as well as the option to transfer to a baccalaureate program.

Arrowhead Region (Duluth, Fond du Lac, Hibbing, Itasca, Mesabi, Rainy River, Vermilion)
Clearwater Region (Brainerd, Fergus Falls, Northland) ● Anoka-Ramsey (Coon Rapids, Cambridge)
Austin ● Inver Hills ● Lakewood ● Minneapolis ● Normandale ● North Hennepin ● Rochester ● Willmar ● Worthington

Minnesota's Community Colleges Are Equal Opportunity/Affirmative Action Institutions

We thank you for the opportunity to have input during the course of the study and for the opportunity to review the draft report.

Sincerely,

Geraldine A. Evans,
Chancellor

Minnesota
Higher Education
Coordinating Board

Suite 400
Capitol Square
550 Cedar Street
Saint Paul, Minnesota 55101

612-296-3974

February 17, 1993

Mr. Roger Brooks
Deputy Legislative Auditor
Office of the Legislative Auditor
Centennial Building
St. Paul, Minnesota 55155

Dear Mr. Brooks:

Thank you for the opportunity to comment on Higher Education Programs. We think the report is generally sound and will help elevate the importance of improving program management in higher education. We do, however, disagree with some of the comments about the Higher Education Coordinating Board, and this letter addresses those issues.

The emphasis and many of the report's recommendations are consistent with and build on Coordinating Board proposals of recent years to improve program management.

Program management was a primary theme in the Board's M SPAN (Minnesota Study of Post-Secondary Access and Needs) 2000 project completed two years ago. The Board recommended that the "public post-secondary systems achieve greater efficiencies through reduction in number of duplicated programs, review of responsibility for offering certain types of programs, and use of alternative methods of delivering programs."

Specific recommendations focused on reduction of program duplication, especially at the sub-baccalaureate level; discontinuation of associate degree programs that do not meet state guidelines; automatic review of newly implemented programs; examination of the program review process of each system; and expanded access to specialized programs through technology. We are pleased that your report has picked up on some of these proposals.

In a broader sense, program management and concern for duplication and inadequate cost containment were the reasons the Coordinating Board made, and continues to make, recommendations to the legislature on restructuring, merger, collocation, consolidation of institutions, and increased use of instructional technologies.

Since release of the M SPAN report and 1991 legislation to expand the Board's program approval authority, the Board has placed the goal of efficiency in higher education at the top of its work agenda and is working to implement the above recommendations.

Further, the Coordinating Board had taken the lead in advocating and implementing legislation for a graduate follow-up system, currently focusing on occupational programs, and later to include baccalaureate level programs.

In reviewing Higher Education Programs, we make the following specific points:

- Management/governance versus coordination. The Coordinating Board has specific responsibility for statewide planning and coordination rather than management of specific programs, which is the responsibility of governing boards. Keeping this distinction in mind is key to evaluating the roles and responsibilities for programs discussed in your report.

- Definition of "program." The assertion in Chapter 4 of the report that HECB has not defined program is inaccurate. The definition was revised in 1980, but the Coordinating Board has had a definition of "program" for at least 20 years, as is pointed out in Chapter 1 of the report.

- Lack of accurate program inventory. It is not accurate to say, as the report does, that lack of a clear definition of program is responsible for lack of a reliable program inventory. The Coordinating Board is dependent on the higher education systems for an accurate, reliable inventory. In fact, Minnesota's higher education systems, like their counterparts nationally, have not given priority to program management and thus have not been able to provide the information needed for a sound statewide program inventory.

- Lack of effective statewide program review. In reporting percentages of program proposals approved by the Coordinating Board, the report greatly misunderstands and underestimates the effectiveness of the Board's program review and approval process. While it is correct that the Board has not in recent years disapproved a program for which the staff recommended approval, there are four other levels at which programs can be, and are altered or withdrawn. First, HECB's program review criteria are shared with faculty as program proposals are developed and faculty committees may recommend that a proposed program not be sent to the administration. Second, campus administrators may not send proposals to the system office, again in part because of HECB's criteria. Third, system office staff may not forward a proposal received by the governing board for

UNIVERSITY OF MINNESOTA

Office of the Vice President for Arts, Sciences, and Engineering

12 Morrill Hall
100 Church Street S.E.
Minneapolis, MN 55455-0110

612-626-1830
Fax: 612-625-8068

February 17, 1993

Mr. Roger Brooks
Deputy Legislative Auditor
Centennial Building
Saint Paul, Minnesota 55155

Dear Mr. Brooks:

I am writing to formally respond for the University of Minnesota to the report "Higher Education Programs" dated February 12, 1993. I would like to commend Mr. Joel Alter and his associates for the thoroughness and professionalism with which this study has been conducted. Preliminary results of the study were made available in a timely manner for review by the University. The concerns that we raised have been addressed. Two minor errors in the table on page 91 relative to the Twin Cities campus should be noted: International Studies is a program, not a department; and the School of Social Work offers only graduate degrees. Thus both should have been excluded from this table.

Please let me know if any further information is required.

Sincerely,

Anne H. Hopkins

Anne H. Hopkins
Vice President for Arts, Sciences, and Engineering

AHH:jc

cc: E. F. Infante, Senior Vice President for Academic Affairs and Provost
Nils Hasselmo, President

Methodology

Finally, we believe that the methodology used in analyzing program costs is based on a construct of what it costs to educate a hypothetical full-year-equivalent student who takes all of his or her third and fourth year courses in the specialized discipline. In practice this is not the case.

While the upper division cost per FYE students in Engineering is shown as $13,587 the projected average annual cost for a typical student enrolled in the four year Electrical Engineering Program at Mankato is substantially different. The EE degree seeking student would enroll in a broad range of courses roughly divided into:

Lower Division General Education	-	90 credit hours
Lower Division Engineering	-	13 credit hours
Upper Division Engineering	-	69 credit hours
Upper Division Non-Engineering Electives	-	20 credit hours
		192 credit hours

Preliminary analysis of actual program costs indicates that the projected annual fully allocated cost of an engineering student would be about $6,300. When one factors in the allocation of costs between the State and the student, recognizing that in FY91 the student payed tuition of $1,742, the State's share of the annual cost for the engineering major drops to $4,558. Whether this figures is high or low must be judged in comparison with costs for other educational expenditures. For example, the cost to Minnesota taxpayers was about a $1,000 less for an engineering student than the $5,564 maximum authorized financial aid grant the State would award a student taking a liberal arts major at a private colleges.

In a subsequent letter we address each of the recommendations specifically related to the Minnesota State Universities. Once again, we appreciate the opportunity to respond to the final report.

Sincerely,

Terrence J. MacTaggart
Chancellor

TJM/sdh

cc: Linda Bunnell Jones, Vice Chancellor for Academic Affairs
Edward McMahon, Vice Chancellor for Finance
Manuel M. López, Associate Vice Chancellor for Academic Affairs

MINNESOTA STATE UNIVERSITY SYSTEM

230 Park Office Building/555 Park Street, St. Paul, Minnesota 55103 (612) 296-2844
FAX (612) 296-3214

AKITA CAMPUS JAPAN
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MOORHEAD
ST CLOUD
SOUTHWEST
WINONA

February 17, 1993

Mr. Roger Brooks
Deputy Legislative Auditor
Office of the Legislative Auditor, State of Minnesota
658 Cedar Street, First Floor Centennial Office Building
St. Paul, MN 55155

Dear Mr. Brooks:

We appreciate the opportunity to respond to the final report on Higher Education Programs produced by the Program Evaluation Division of the Legislative Auditor. We find the report considered and careful in its approach. The authors reflect a strong grasp of complex issues. We continue, however, to have concerns about the report. The State's long-standing policy on access and its commitment to a high quality educational experience is not considered in the discussion of program cost. The focus on duplication, cost, and efficiency does not yield a complete picture of Minnesota's policies on higher education. Further we believe there is potential for misunderstanding the net cost to the State for programs as a result of how costs were computed and displayed. Other concerns center on the report's analysis and recommendations on engineering education, teacher education programs, program cost and efficiency, and review of new and existing programs.

Engineering

As you know, the Legislature, with the full support of the business and technical community, appropriated categorical funding to establish electrical engineering programs at both Mankato and St. Cloud State Universities in 1984 and composites engineering at Winona State University in 1989. Part of the thinking for locating engineering programs outside the University of Minnesota-Twin Cities stemmed from a belief 1) that regional economic development would be improved by the presence of students and faculty in these programs in key market centers outside the Twin Cities and 2) that there needed to be alternatives for students to the large programs at the University of Minnesota-Twin Cities and, through reciprocity, North Dakota State University.

Enrollments expected in engineering have not yet materialized as a result of the lack of interest in engineering on the part of incoming high school students. Low participation in science and mathematics in Minnesota high schools helps explain this unfortunate circumstance. Indeed most universities across the country are experiencing decline in engineering enrollment while those in the Minnesota State Universities have been stable, even increasing. The need for engineers that prompted the support of the business and technical community remains.

As the experience of the last three decades indicates, the demand for engineers is cyclical. New engineering programs cannot be geared up at a moment's notice. It is important to the State and its economy to have programs in place in order to meet the demand generated by the next upturn in the cycle.

Teacher Preparation

A second issue of major concern to the Minnesota State Universities is the report's comment on duplication and efficiency in teacher preparation programs. The State has always had policies that favor access to and student choice of a course of study. All Minnesota State Universities teacher education programs inform students at the beginning of their study about the keen competition for teaching jobs in Minnesota. Yet despite these admonitions students continue to believe that they will be one of the six out of ten Minnesota State Universities' graduates to find a job in this state. Any decision to limit student choice deserves careful discussion.

The report acknowledges the Minnesota State Universities' deliberate reduction in admission to teacher preparation that began in Fall 1992. At some campuses admission was reduced by as much as 20%. It is important to note that forced or even further reduction in the numbers admitted to teacher education may not change the number of students in the university. Students will simply choose different majors. Nor will the reductions in public university admission to teacher preparation result in a decline in the numbers of people preparing to teach. Students turned away from teacher education at a public university can simply enroll in one of the eighteen private colleges that offer teacher education.

The fundamental policy question in teacher preparation is whether the State is willing to trade-off some differences in cost in order to provide economic and geographic access to students. In the past, Minnesota has repeatedly come down in favor of access. Policymakers for higher education may need to review the balance between access and real cost of programs to the State, but such a review should include all institutions, public and private, and all programs. The State's intent at present is not entirely clear.

Review of New and Existing Programs

A third area in which we want to raise questions involves expanded program review procedures. We are concerned that the proposed delay of five years to fully approve new programs could disadvantage students. Further we believe that State or System-level review may not have the desired impact. We believe that the best program review occurs at the local university and that System governing boards already represent a point of accountability in that process.

consideration by HECB staff and PAC because informal conversations with HECB staff indicate that the proposed program may not meet the HECB criteria. Fourth, once formally sent to HECB, a proposal may receive a negative response by HECB staff or PAC, and the system may then withdraw the proposal. The eight percent withdrawal figure refers only to those programs that successfully make it past the first three review points. Such programs usually are withdrawn when it becomes known that our staff recommendation to our Board will be to disapprove.

- Review of existing programs. During the 1970s and 1980s, the Coordinating Board concentrated its review authority on proposed new programs while, for the most part, responsibility for reviewing existing programs was assumed to be that of the systems. The Coordinating Board has, however, reviewed existing programs in specific disciplines of interest, such as, on several occasions, engineering and teacher education, which are featured in your report. On three occasions, the Board has reviewed trends in the number of graduates from existing Minnesota post-secondary instructional programs, highlighting programs with the most severe decrease in graduates and listing programs that should be considered for reduction or closure. Last fall, the Board adopted a policy for the review of existing programs. Your concerns and suggestions will be helpful as the Board implements the policy.

- Gap Between Expanded Oversight and Budget Realities. The desirability of expanding management and oversight of programs must be reconciled with budget realities. There have been increased demands on the higher education community to expand state level leadership and oversight activities in a variety of areas at the same time there has been increased pressure to decrease state level staffing. In fact, your report last spring would seem to be an example of such pressure.

Our comments are not intended to detract from your important report, but to offer a broader context and perspective. It is the Coordinating Board's goal to continue to actively promote enhanced program efficiency through stronger program management, expanded use of new technologies, and restructuring and reallocations.

Sincerely,

David R. Powers
Executive Director
DRP/kjp

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Evaluation reports can be obtained free of charge from the Program Evaluation Division, Centennial Office Building, First Floor South, Saint Paul, Minnesota 55155, 612/296-4708. A complete list of reports issued is available upon request.

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Centennial Office Building, Saint Paul, Minnesota 55155

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